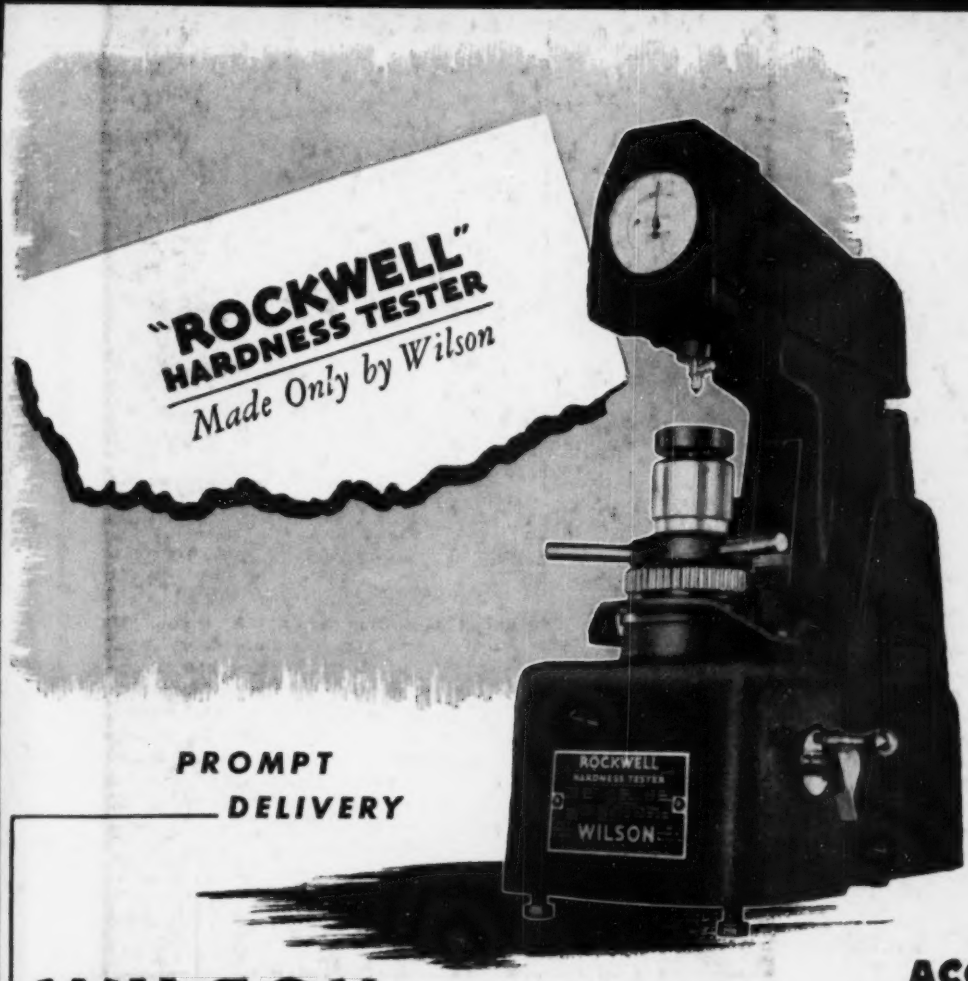
MODERN Machine Shop



PROMPT DELIVERY

WILSON MECHANICAL INSTRUMENT CO., INC.

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-G PARK AVENUE, NEW YORK 17, N. Y.

ACCO

TRADE MARK

GUARDED 3 ways!



Heald guarding saves time – saves effort – saves maintenance

Each machine shipped from the Heald factory is *triply guarded* – for safety, convenience, and maximum efficiency of operation.

Proper machine guarding is more than just a matter of meeting safety requirements – or J.I.C. standards. It means guarding against extra costs, too! And the guards and covers for every Heald machine are especially designed with this in mind.

You don't have to install special guards for your own particular tooling set up. That's all taken care of for you. You can let the chips fall where they may, without danger of fouling the table ways or piling up under bridges. Coolant is carefully controlled, too – with guards designed to prevent spattering on the floor or operator. And dust and dirt – perennial enemies of precision equipment – can't harm the working parts or electrical controls.

In short, Heald's extra precautions in guarding add up to extra savings for you – in reduced maintenance, easier operation, and sustained production efficiency.

Remember – when it comes to precision finishing, it pays to come to Heald.

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VOLUME 23 NUMBER 6
NOVEMBER, 1950

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431 Main St., Cincinnati 2, Ohio

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Printed in U. S. A.

Acceptance under Section 34.64, P. L. & R., Authorized

MODERN Machine Shop

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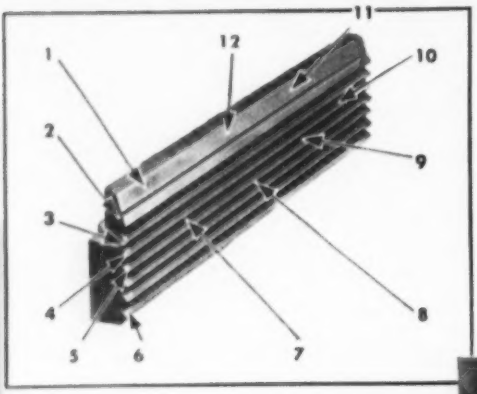
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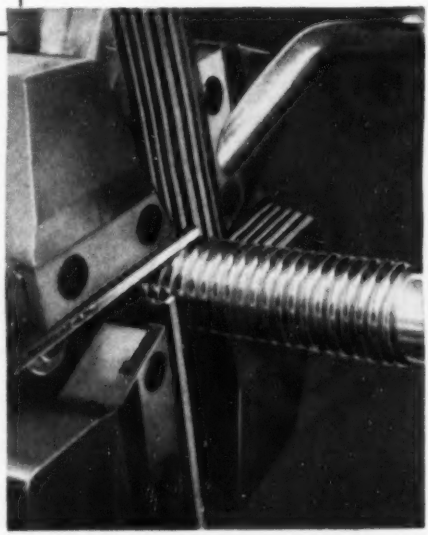
The Finest Thread Cutting Tool in Industry



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Important features are built into the basic design of the Landis Tangential Chaser and bring large returns in cost saving, increased output, and improved product quality both on the production line and in the maintenance shop.



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9. *ALL DIAMETERS* of threads having same pitch and form cut with same chasers by using proper holders.
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11. *CHASER LENGTH* provides low tool cost and exceptionally long life—chasers reground to 80% of length retain initial accuracy of pitch, diameter, and depth of cut.
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LANDIS *Machine* COMPANY

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CUT DIAMOND AND GRINDING COSTS 50% ON CINCINNATI CENTERLESS GRINDERS

With the new CITCO Hydraulic Automatic—Adjustable DIAMOND TURNER



Cincinnati Centerless Grinder showing Citco Hydraulic Diamond Turner installation.

If you have one or a battery of Centerless Grinders, you owe it to yourself to check the following points against your present operation —then figure it for yourself, how CITCO saves you money! ● Maintains sharp diamond and fast cutting wheel at all times ● Necessitates dressing *60% less* often—consequently more pieces per dress ● Longer diamond life, longer wheel life ● Holds positive form, size and straightness ● No shifting of cam ● Diamond is always on center. The Citco Diamond Turner is precision built and made to last the life of the machine of which it becomes a rigid and permanent member. All moving parts sealed in oil.



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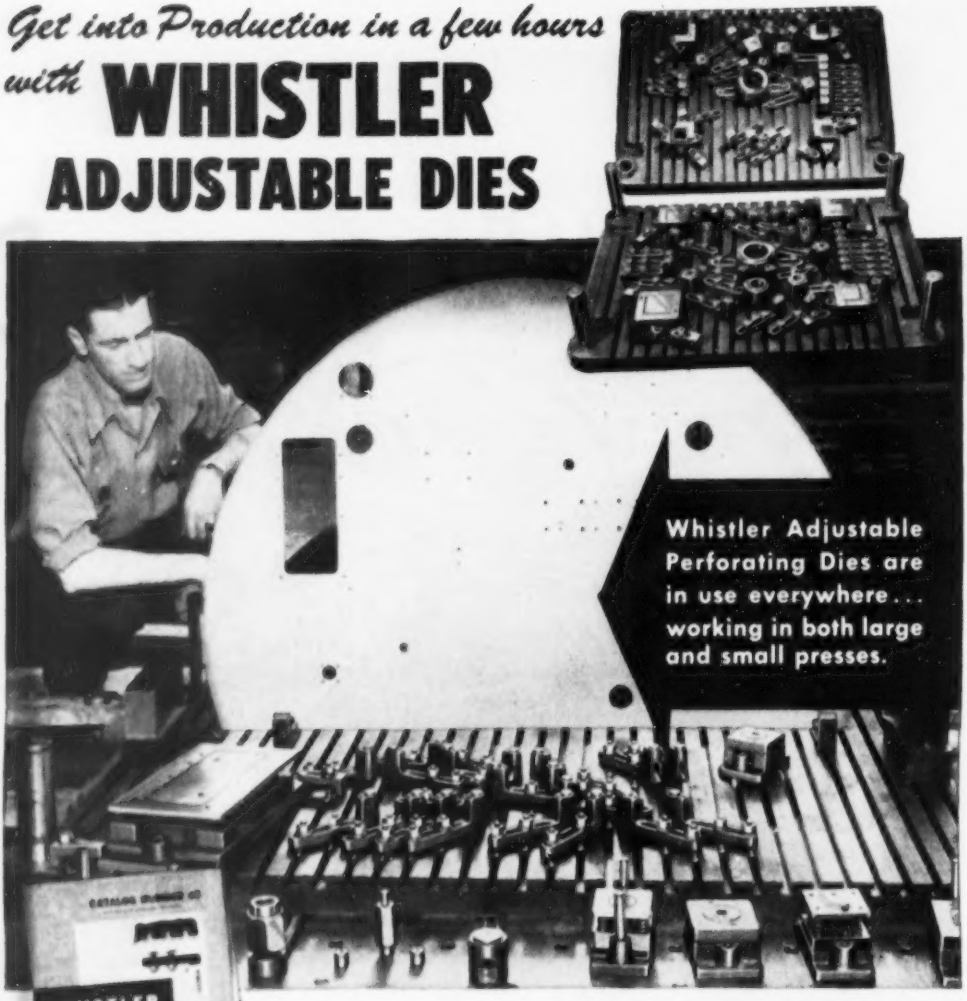
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Manufacturers of Citco Solid Copper Diamond Tools . . . They're cool.

Get into Production in a few hours with

WHISTLER ADJUSTABLE DIES





There are plenty of other advantages in using Whistler Adjustable Dies. It makes sense to get the complete story. And it's easy to do. Write for your Whistler Catalog today.

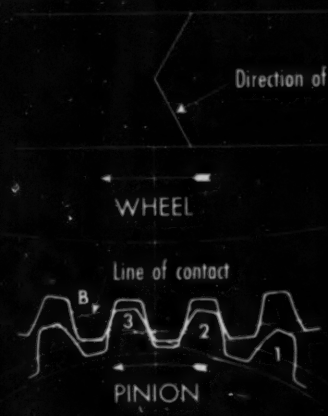
Whistler perforating dies now offer a double-barreled advantage in getting into production faster. Standard sizes of round hole punches and dies... 1/32 to 3"... can be shipped promptly. Special shapes... squares, ovals, rectangles, group and notching dies, are quickly made to order.

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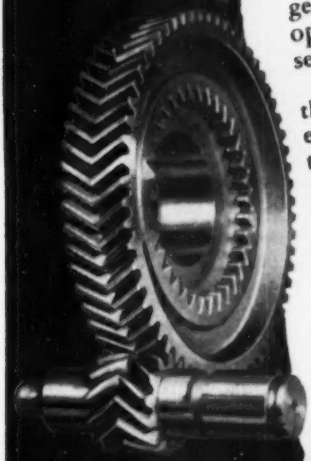


Farrel Gears Help Machine Tools Retain Original Accuracy

This diagram, which illustrates the nature of the contact between a pair of Farrel gears, shows why these gears continue to operate smoothly after so many years of service.

The lines of contact are oblique across the face of the teeth, and the pressure is evenly distributed over each tooth, from tip to working depth line. This means that there is no tendency for the contour of the teeth to wear unevenly.

Farrel herringbone gears are made of the finest grade materials, in a complete range of sizes from 1/4 inch to 20 feet in diameter. Write for further information or for engineering assistance.



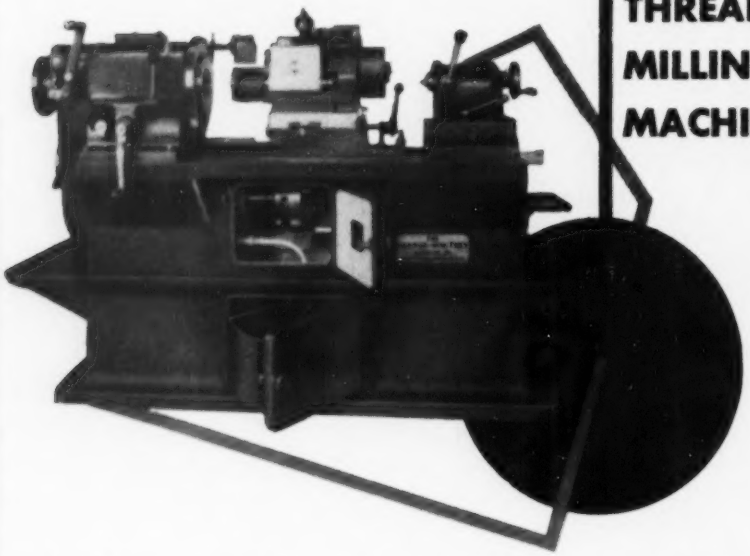
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FB-635

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For low-cost, perfect threading select the H-W Thread Miller . . . a standard of highest quality throughout the industrial world.

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Hanson Whitney

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GISHOLT MACHINE COMPANY
Madison 10, Wisconsin



THE GISHOLT ROUNDTABLE
represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcome here.

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To make a long ~~story~~ SETUP short

CINCINNATI FILMATIC UNIVERSAL GRINDERS

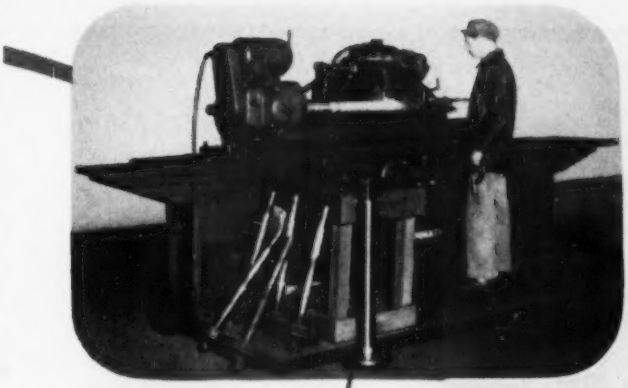
Save time in your

FILMATIC

How long does it take to get going on small lots? Whatever the answer is, set-up time constitutes one of the major elements in the cost of small quantity precision toolroom grinding. Reduce set-up time and costs go down fast. You can be sure of brief setups on CINCINNATI FILMATIC Hydraulic Universals, for they have many features of value in small quantity production. To mention only three: hinged type internal grinding head, always on the job; FILMATIC spindle bearings, never require adjustment; speed ranger headstock drive — instantaneous finger-tip selection of infinite number of speeds; lathe standard spindle nose on headstock. ¶ The photographs show three setups which take advantage of CINCINNATI FILMATIC Hydraulic Universals' many features. Others have just as much value in reducing costs. Write for catalogs: G-486-4 for 12" machine; G-474-3 for 14" and 18" machines. Brief specifications in Sweet's.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

CINCIN



Typical shop shot, showing a CINCINNATI FILMATIC 14" Hydraulic Universal in action and the work assigned to it. Manufacturing quantities vary from one to five parts.

shop





Above: Grinding an internal broach on a CINCINNATI FILMATIC 14" Hydraulic Universal Grinder. The taper portion is ground by the traverse method, and then each tooth is "backed off" separately.

Left: The internal grinding head is ready for work in a minute or less. In the illustration, the hole in a drill jig bushing is being ground to accurate size.

CINCINNATI

REPLACE WITH A NEW CINCINNATI

NATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
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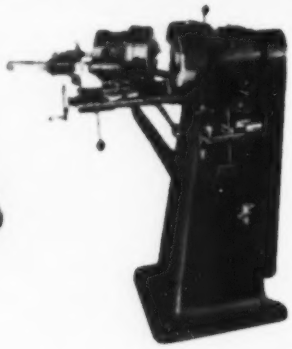
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OLIVER OF ADRIAN

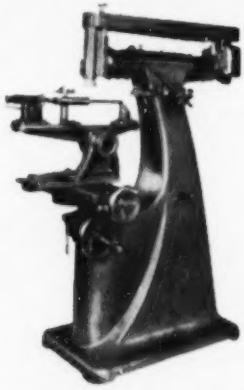
For 30 years Oliver of Adrian has designed and manufactured precision machines with the firm thought of the future. Oliver Instrument Company is dedicated to the task of producing for American Industry the ultimate in cost reducing toolroom machinery. Oliver gives you that "something extra" that is vital to outstanding performance.



Oliver Template Tool Bit Grinder (2 models)



Oliver No. 510 Drill Pointer



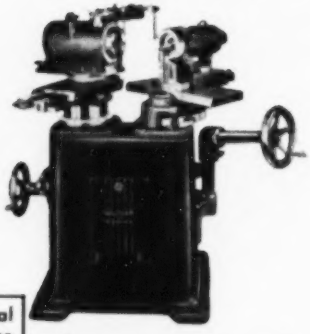
Oliver Ace Tool and Cutter Grinder (2 models)



Oliver Diemaking Machine (5 Models)



Oliver No. 21 Bench Drill Grinder



Oliver No. 2 Arc Face Mill Grinder (2 Models hand operated or fully automatic)

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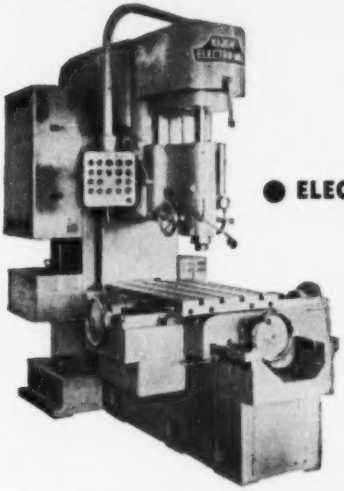
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. . to Boost Output and Lower Costs

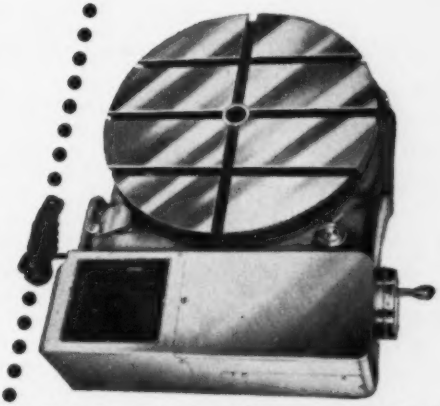


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A self-contained motor-driven unit which adapts any milling machine for rotary milling or indexing. Eliminates set-up time. No installation—just plug into electric outlet. 18 Feed changes, 1½″ to 54″ or 3″ to 108″ per minute.



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MACHINERY COMPANY

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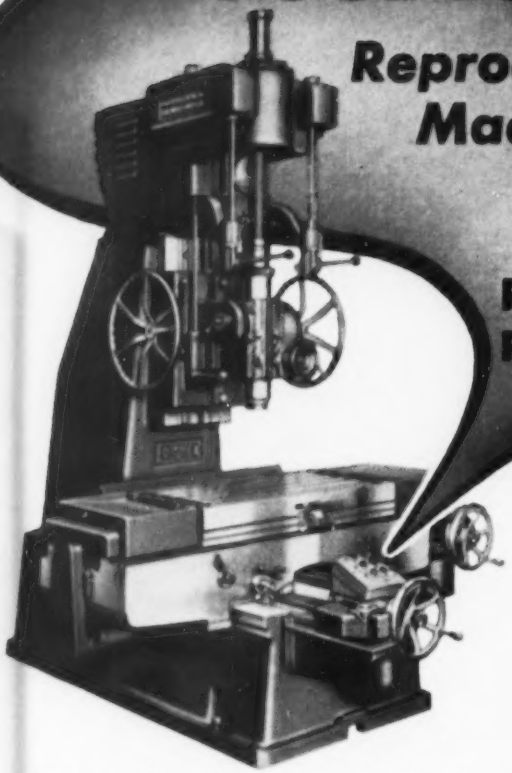
*7-Type 1½-in. maximum cutter stroke.
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Reproduction Machine with AUTOMATIC PUSH-BUTTON POSITIONING



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This new No. 42P reproduction machine with automatic table positioning makes possible a plus or minus .0001" accuracy merely by pressing a button on the control panel conveniently located at operator's position. Two electrical cycles then quickly bring table to the desired position. Push buttons for rapid traverse in and out, right and left are provided and safety switches protect machine in all directions.

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Increase, improve, modernize your production with the new Fosdick 42P machine with automatic Push-Button control.

Folder and complete catalog sent gladly upon request. Catalog Number MMSJP.

FOSDICK MACHINE TOOL CO.
CINCINNATI 23, OHIO

Jarvis

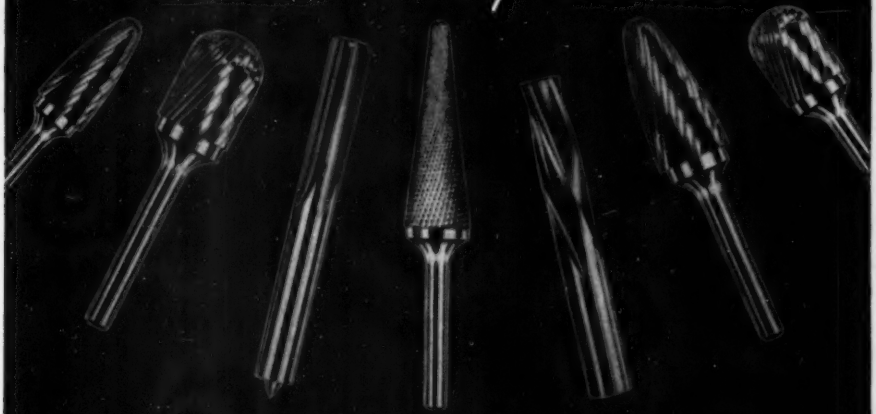
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Quality

BORING BITS
END MILLS



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MIDDLETOWN IN CONNECTICUT

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Profit-building, Time-saving ACCESSORIES
for G.&L. Horizontal Boring, Drilling and Milling Machines

The Giddings & Lewis Machine Tool Company manufactures various types of rotary tables, and time-saving auxiliary attachments. Rotary tables range in size from the plain 24" diameter type to completely self-contained, power driven units weighing 55,000 lbs. which will handle work up to 25 tons. Vertical rotary tables as well as combinations of horizontal and vertical tables are also manufactured. These can be rotated 360° in both horizontal and vertical planes and are power operated.

TIME-SAVING ATTACHMENTS—include the continuous feed facing head, angular milling heads, auxiliary tables, and special equipment for individual needs.

COMBINATION PLAIN AND HAND FEED ROTARY TABLES

are self-contained units designed to allow the hand feed worm to be declutched for rapid or plain indexing. In addition to ½° graduations, four adjustable stops are furnished together with dial indicator for precision indexing. Standard sizes are: 36", 48" and 60" with round, square or rectangular table tops.

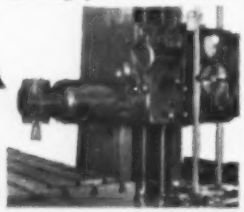


COMBINATION PLAIN, HAND AND POWER FEED ROTARY TABLES

are identical to the plain and hand feed tables except they are power driven as shown. Standard sizes are: 36", 48" and 60" with round, square or rectangular table tops.

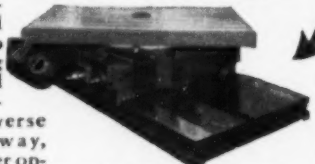
ANGULAR MILLING ATTACHMENTS

are used to increase the versatility and flexibility of the horizontal boring machine. They are used on hard-to-reach milling jobs and those surfaces which are perpendicular or set at an angle to the machine spindle. Three different types are available.



PRECISION ROTARY TABLES WITH POWER FEEDS

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make it possible to bore and face simultaneously and combine other operations not ordinarily performed on the horizontal boring, drilling and milling machine. They are available in 17", 22", 24", 26", 30", 36", 48" and 60" sizes.



Features include: 6 power feeds; feed selector; directional control; micrometer adjustment; and 2 tool holders.

WRITE FOR ADDITIONAL DATA—literature describing the complete line of G. & L. machines and time saving attachments is available and will be sent to you free on request.

G&L HYPRO

GIDDINGS & LEWIS MACHINE TOOL CO.

126 DOTY ST. • FOND DU LAC, WISCONSIN

Cuts grinding time in half

Savings pay for tools in 5 months

THIS manufacturer of materials handling equipment was using universal electric grinders when the Rotor Application Engineer called to find ways of cutting grinding costs. The Rotor Application Engineer recommended replacement with Rotor Air Grinders and demonstrated them with these results:

Grinding time cut 50% due to greater cutting power and higher speeds.

Operating conditions improved with lighter-weight, cooler-running tools.

In labor savings alone, Rotor Air Grinders actually paid for themselves in 5 months.

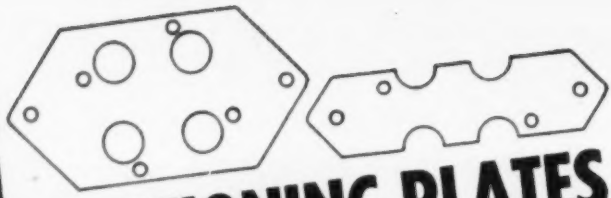
Similar possibilities may exist in your plant too. Call the Rotor Application Engineer for an unbiased analysis of your needs.

AIR O'TOOL



THE ROTOR TOOL CO.
CLEVELAND OHIO

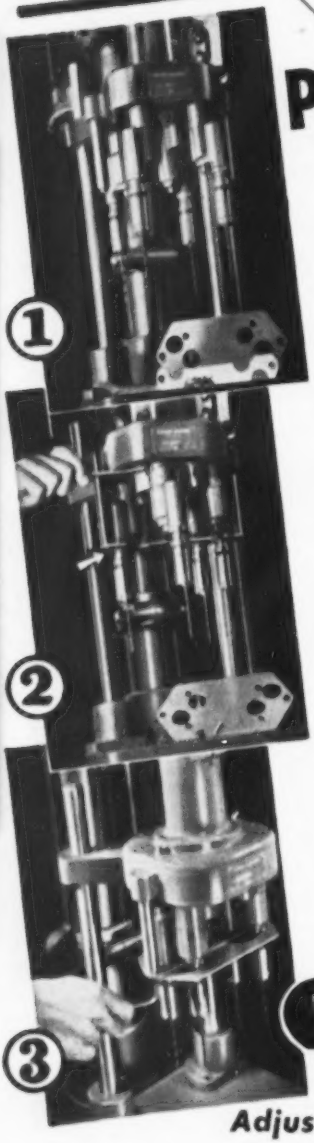
DUAL



POSITIONING PLATES

Assure

Fixed-Spindle Accuracy with KWICK-CHANGE Adjustable Drill Heads



The *average set-up* man is as good as the best when he sets a multiple drilling job on a KWICK-CHANGE Drill Head with Dual (patented) Positioning Plates. This is all he has to do: —

1 **Get the proper Positioning Plates, for the job to be run, from the tool crib.**

2 **Mount the Half-Hole *Positioning Plates* on the support posts and swing the spindles into the positions indicated by the half-holes.**

3 **Mount the *Locking Plate*, with *complete holes*, on support posts; tighten bolts and spindle locknuts. Set-up cannot shift unless the Locking Plate is removed.**

Your set-up man knows the slow process involved in resetting spindles with a single-hole plate. There is no quicker, easier way to assure accurate set-ups that *stay put* than with KWICK-CHANGE DUAL Spindle Positioning Plates.

Write for Illustrated Bulletin and Name of Nearest Representative

WISCONSIN DRILL HEAD CO.

4985 North 124th Street • BUTLER, WISCONSIN

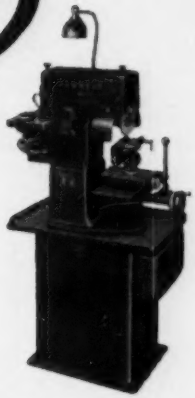
Adjustable and Fixed-Spindle Drill Heads

A 5842-½I
November, 1950

OVER 5000

Hammond

CARBIDE GRINDERS IN SERVICE



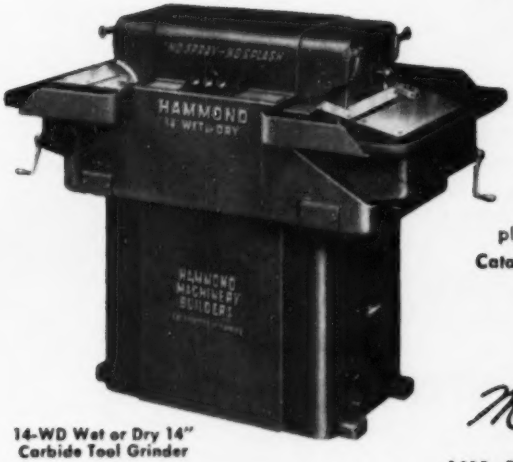
CB-77 Chip Breaker and Diamond Finishing Grinder

Save

TIME
TOOLS
WHEELS



WD-10 Wet or Dry 10" Carbide Tool Grinder



14-WD Wet or Dry 14" Carbide Tool Grinder

MORE HAMMOND CARBIDE TOOL, CHIP BREAKER and DIAMOND FINISHING GRINDERS are being used today — in more plants than ever before — to grind Carbide and High Speed Tools easily, accurately . . . better. Hammond offers "America's Most Complete Line." — **Write for Carbide Grinder Catalog No. 225.**

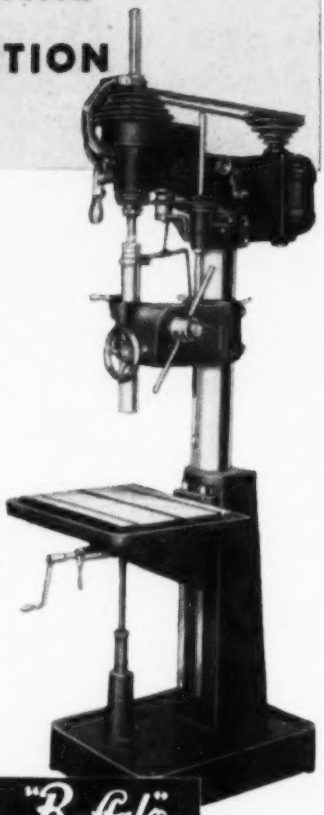
Hammond Machinery Builders INC

1615 DOUGLAS AVE. • KALAMAZOO, MICH.



Obsolescent Tools Drain Profits!

REPLACE WITH MODERN "Buffalo" TOOLS AND WATCH PRODUCTION CLIMB!



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If you drill up to 2" holes in cast iron, you'll get easy, smooth operation with the big, rugged "Buffalo" No. 22 Drill shown at right. WRITE FOR BULLETIN 2989-F.

With the "Buffalo" "RPMster," you can change speeds instantly without shutting off the motor. WRITE FOR BULLETIN 3257 and see how this can cut your setup time.

For a rigid, accurate, fast-action drill to handle up to 7/8" holes in cast iron, WRITE FOR BULLETIN 2730-F, on the No. 16 Sensitive Drill.

BUFFALO FORGE COMPANY

388 Broadway Buffalo, New York

Canadian Blower & Forge Co. Ltd., Kitchener, Ont.

"Buffalo" METAL WORKING TOOLS

.0001" ACCURACY



PRECISION OF FIT

Dumore Tool-Post Grinders turn out internal work fast and accurate to .0001". Only Dumore combines rugged strength with precision construction to give you big grinder performance and accuracy at a price you would expect to pay for an accessory.

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Fast set-up, high speed, interchangeable quills, ability to take turn in work cycle, plus flexibility of set-up, mean lower cost per piece. See for yourself how others keep costs down with Dumores. Write today for free catalog!

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Export Address: **13 East 40th Street New York 16, N. Y., U.S.A.**



Tool-post Grinders | Handgrinders | Automatic Drill Head | High Speed Drill Press | Quills | Flexible Shaft Tools

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MARVEL High-Speed-Edge Blades assure Faster, more Accurate cutting with proven Economy and complete Safety. Only the MARVEL is a composite blade with a high speed steel cutting edge electrically welded to an exceptionally tough, strong alloy steel body.

The High-Speed-Edge does the cutting while the alloy back with hardened eyes, carries the load. Blade tensions up to 300% higher than those possible with ordinary blades are recommended. This greater tension is confined to the cutting or leading edge by the location of pin holes (exclusive MARVEL design feature) and cannot be overcome by work resistance. Heavier feeds and greater speeds are practical without "run out."

With greater accuracy, higher production and lower cost per cut, come the extra dividend of Safety, for MARVEL High-Speed-Edge Hack Saw Blades are Positively Unbreakable—*they will not shatter.*

Ask your local MARVEL distributor (see classified phone book) to help you modernize your metal sawing with MARVEL High-Speed-Edge Blades. They cost no more than ordinary high speed steel blades.

1. High Speed Steel cutting edge.

2. Tough unbreakable alloy steel body with hardened eyes.

1. & 2. Integrally welded to make a fast-cutting, long lasting composite blade that is positively unbreakable.

ARMSTRONG-BLUM MFG. COMPANY

"The Hack Saw People"

5700 BLOOMINGDALE AVENUE **CHICAGO 39, ILLINOIS**

Metal Cutting **MARVEL SAWS**

Better Machines-Better Blades

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

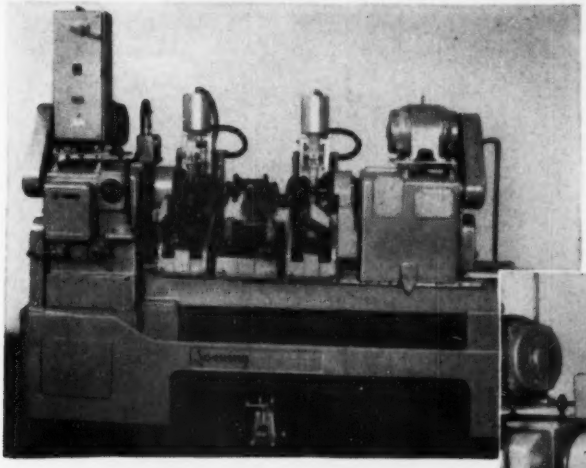
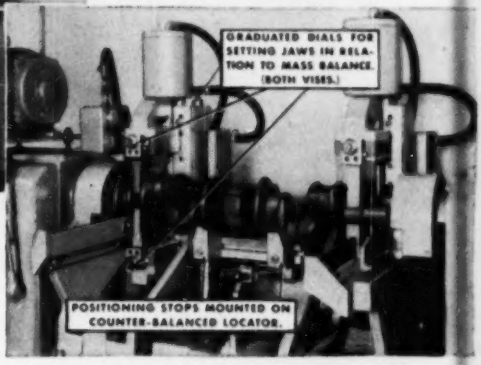


FIGURE 1. Vises are positioned vertically to facilitate loading and unloading heavy crankshafts.

FIGURE 2. Counter-balanced positioning locator stops raised against cheeks to position crankshaft for accurate depth of centers.



IMPROVED LOADING METHOD SPEEDS UP Lo-swing CENTERING OPERATION ON HEAVY CRANKSHAFTS

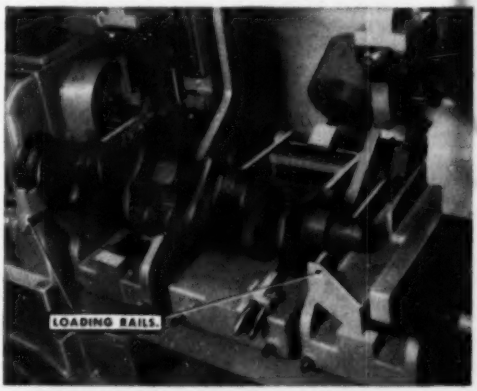
Problem: To reduce operator fatigue in centering both ends of heavy crankshafts in relation to center of mass balance.

Solution: The Model "CS" Lo-swing Automatic Centering Machine selected for this job was equipped with vertically-designed air-operated vises, fitted with built-in loading rails. (Fig. 1).

In operation, the first crankshaft forging of the lot is centered with all jaw adjustment dials set at zero. The crankshaft is then centered and tested for mass balance in a balancing machine, after which fine adjustments are made on the vise jaws. The machine is now ready for a production run of a particular type of crankshaft. Depth of the two centers in relation to the cheeks is accurately maintained by the counter-balanced positioning locator stops shown in Fig. 2. With these vertically-positioned vises, the operator merely sets the crankshaft on the loading rails and pushes it forward until it drops into position in the open vise jaw. (Fig. 3)

Lo-swing engineers are at your disposal to assist with your handling and machining problems.

FIGURE 3. Vise jaws open to level of loading rails... no lifting required to remove crankshaft from vise jaws.



SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

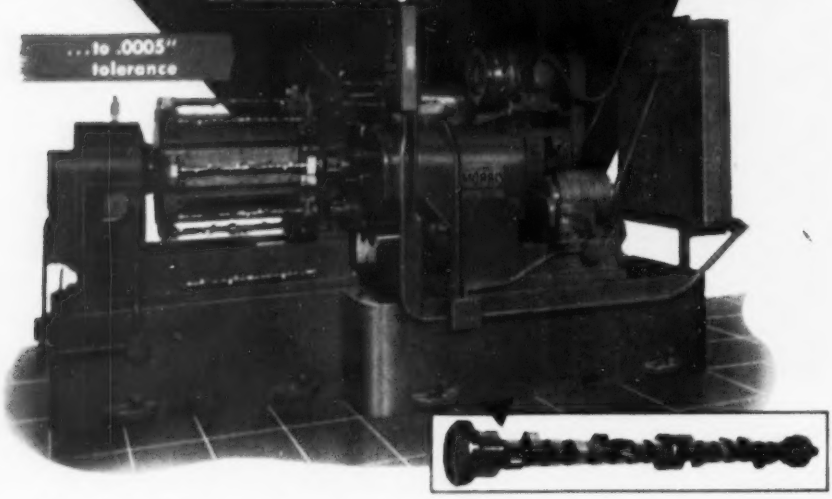
PRODUCTION COSTS ARE LOWER WITH Lo-swing

Accuracy plus Speed

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...Production rated: 200 pieces per hour

...to .0005" tolerance



There's no secret in the amazingly high production records set by MORRIS *Mor-Speed* Machines. Each one produces faster, with micrometer accuracy, more parts at lower cost . . . because it's designed for the specific job. Yet their cost is low, compared to ordinary "special purpose" machines, because each comprises many standard parts, engineered to do the special job. Four holes on the flange of each of eight precision camshafts are drilled, reamed, counterbored and tapped on this MORRIS 8 Station Indexing Machine. Work pieces are indexed to the hydraulically operated head by means of a Geneva cam mechanism. The lead screw feed tapping head is driven independently by a reversing motor. Eight hand clamp fixtures hold the work pieces. Production is rated at 200 pieces per hour at 80% efficiency.

MORRIS High Production Machines save space, time and costs for leading manufacturers the nation over. If you have multiple drilling, reaming, tapping and boring operations on a mass production basis, ask Morris Engineers for a no-obligation estimate of savings possible on your specfic jobs.

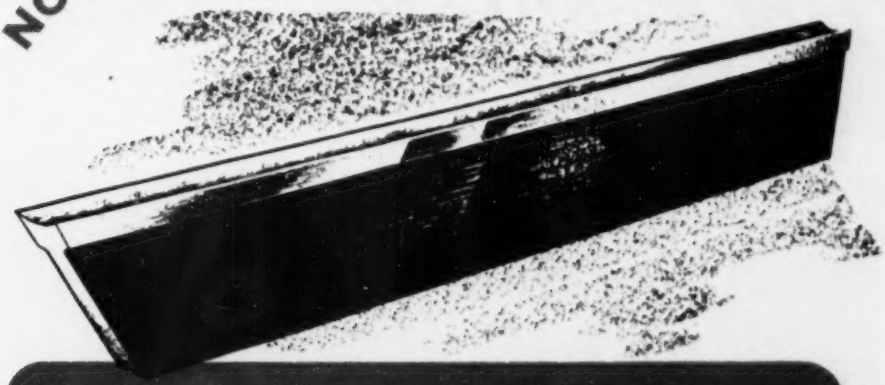
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Builders of MOR-SPEED Lines

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None can do what **EMPIRE'S**

Luers Type Cut-off Blade

will do

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Cut-off blades are tools subject to conditions different from those of other tools and will perform most efficiently only when specialists' recommendations are followed.

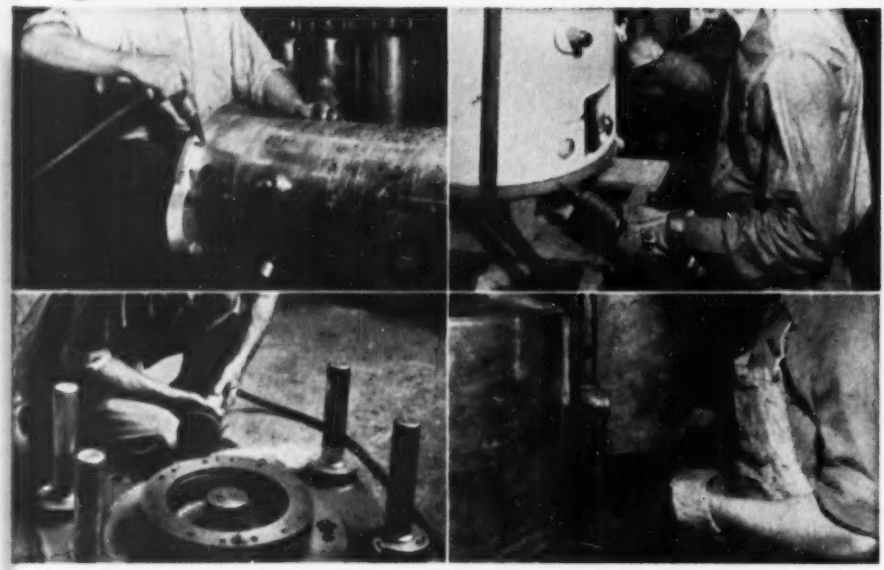
Available from stock are blades of four types of high speed steels developed to meet the demands of cut-off operations. And on short notice you can get blades of cast alloys and tungsten carbide.

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Made by Empire Tool Company of Detroit, Michigan, under license issued by John Milton Luers Patents, Inc.

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Tool Maintenance Costs CAN Be Controlled!



Here's Proof from RHEEM MANUFACTURING CO. Chicago, Illinois

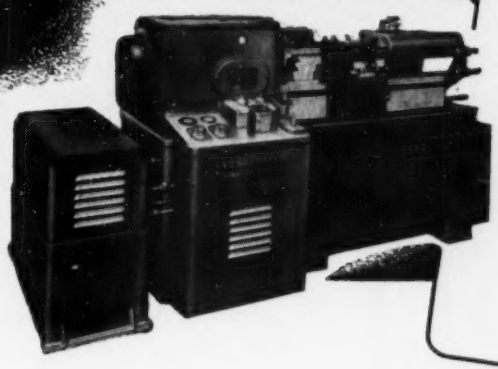
• In the Kedzie Avenue plant of the world's largest manufacturer of automatic water heaters, thirty-nine Buckeye Air Tools — screwdrivers, drills, wrenches, belt sanders and grinders—are in constant use on busy production lines. During the past four years, maintenance costs, including repair parts, for all these tools have averaged less than one dollar per day—*approximately 2½ cents per day per tool!*

How about tool maintenance costs in your plant? Chances are, there's an opportunity to make substantial savings in maintenance time and expense, not forgetting that less maintenance means greater productive output, too. Whenever you like, we'll be happy to show you just what Buckeye Tools can do in your plant—there's no obligation, and you'll be the sole judge . . . fair enough?

Buckeye Tools
CORPORATION
DIVISION 17 • DAYTON 1, OHIO

PORTABLE AIR AND ELECTRIC TOOLS FOR INDUSTRY

these PLUS VALUES mean more output per man hour



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2. Super-speed for faster cuts
3. Super-smoothness for finer cuts
4. Super-rigidity for truer cuts
5. Completely automatic cycles for easier cuts

LIPE *Carbo-Matic* LATHE

You *can* get greater output per man hour and week, and the Lipe Carbo-Matic Lathe will help you get it.

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Completely automatic with a smooth flexibility of control that affords a larger number of set-up combinations for a greater variety of work, the Lipe Carbo-Matic holds operator motions to a minimum. There is a positive stop for all feeds, a time delay for "dwell", and a micrometer adjustment for depth of cut on all tool carriages. All contributing to more output per man and machine hour.

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Lipe-ROLLWAY CORPORATION, Syracuse 1, N. Y., U.S.A.
Cable Address: LIPEGEAR

at the comfort level
you can see what you're doing



THE CINCINNATI

GILBERT

MACHINE TOOL COMPANY

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Notice the "wide angle visibility" the Gilbert radial operator has with the head at the "comfort level": (most convenient working height). It means better, faster work and less operator fatigue. You see, in the Gilbert-type head the spindle and the controls are closest to the arm, and the head is normally above the operator's convenient view of the work. So, for a given work height, the Gilbert arm is lower than usual. Deflection is reduced. Accuracy is improved. Dozens more design refinements make Gilbert radials *do more work* and pay a higher return on your investment. For full information on this machine see Bulletin 349. Write for it today, on your letterhead, please . . . The Cincinnati Gilbert Machine Tool Co., 3360 Beekman Street, Cincinnati 23, Ohio.

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50 MODELS

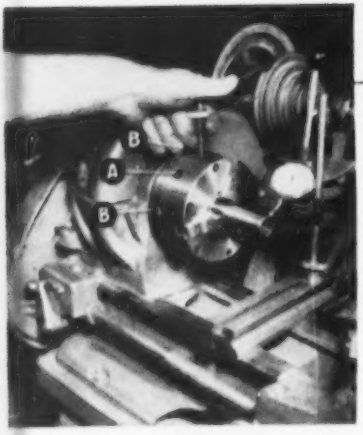
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THE MOST VERSATILE CHUCK YOU CAN BUY!



FIRST CHUCK ADVANCE IN 50 YEARS!

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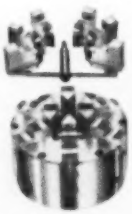
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6 STEP-JAW COLLET CHUCK
3 sizes—
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6 JAW PRODUCTION COLLET CHUCK
3 sizes—
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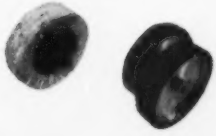
Buck AJUST-TRU CHUCKS

BUCK TOOL COMPANY
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EXTREME CONTOURS... are *easy to finish* the Behr-Manning way!



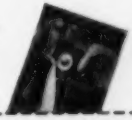




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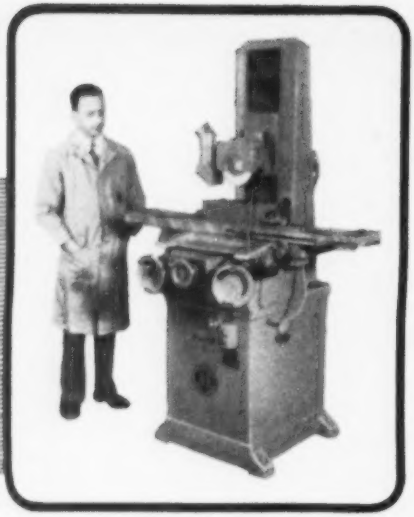
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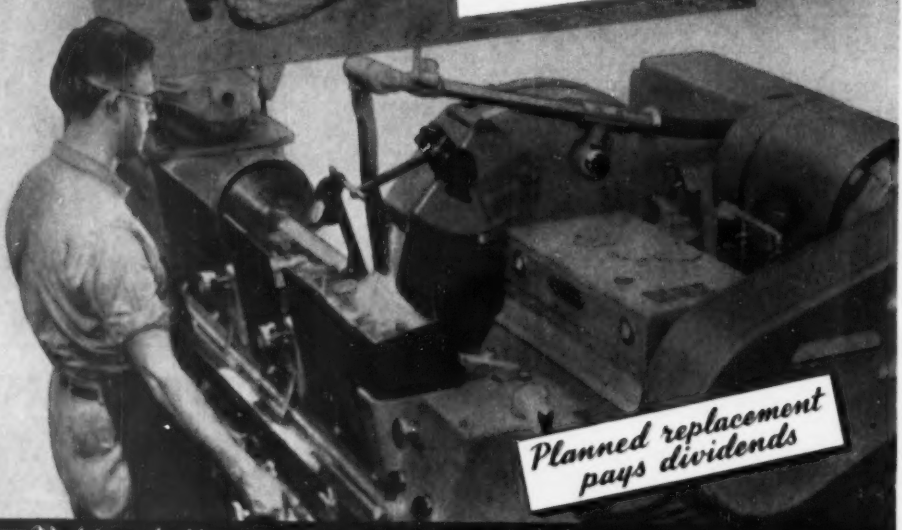
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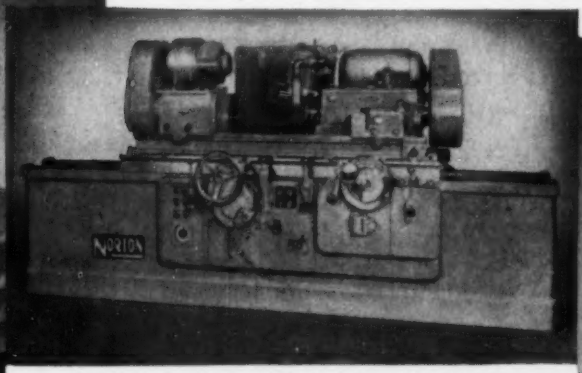
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Hack Saw blade above has been permanently marked in a Model 175 Hydraulic Marking Machine using a solid engraved lettering knurl.

Your name, model number, part number, serial number or decorative designs can be rolled into your components to improve their appearance and facilitate identification.

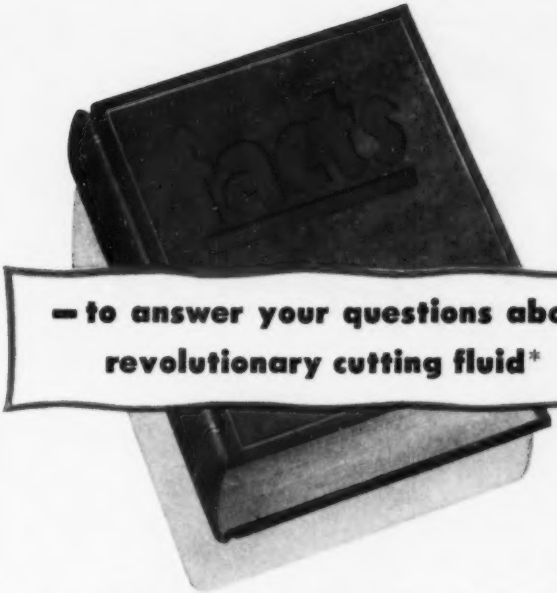
Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

WRITE FOR CATALOG

GTS

GEO. T. SCHMIDT, INC.

1806 W. BELLE PLAINE AVE.
CHICAGO • 13 • ILLINOIS



— to answer your questions about this revolutionary cutting fluid*

Q. Will ANTISEP All-Purpose Base work safely in automatics?

A. *Yes. It has been and is being used in every type of screw machine. The Houghton Man has data on how to clean up machines before installing and how to handle machine lubricant mixes.*

Q. Will ANTISEP A. P. BASE gum up, or cause gumming?

A. *Any gumming which might occur is the result of putting this coolant in dirty machines. The new mix should be run for a day or two and then dumped to get rid of "gunk" loosened by the washing action of A. P. Base. Water softener may be needed in some localities.*

Q. Will Antisep A. P. Base live up to its name as regards antiseptic value?

A. *Yes. No dermatitis complaints have been recorded. A powerful germicidal additive prevents growth of "bugs." Operators like the antiseptic ability of A. P. Base.*

Q Should Antisep A. P. Base be used for grinding?

A. *Not usually recommended for grinding, as film strength additives tend to load up the wheel. Here we advise ANTISEP SOLUBLE GRINDING OIL.*

Q. Can this Base be used as a drawing lubricant also?

A. *Yes. It may be mixed with equal parts of oil or water and used for stamping or punching.*

Q. Will Antisep A. P. Base clean readily from the work?

A. *Yes, in any mild alkaline cleaning bath, emulsion cleaner tank or standard degreaser.*

Q. Will Antisep All-Purpose Base save me money?

A. *Yes—mixed with water, it costs between 6 and 8 cents per gallon, depending upon the dilution. Compare that with your 22 to 45 cent straight oils!*

For answers to any further questions, prices and application data, write E. F. Houghton & Co., 303 West Lehigh Avenue, Philadelphia 33, Pa.

*** HOUGHTON'S**

ANTISEP

All-Purpose

CUTTING BASE


AS LOW AS 86¢ each
When you specify Carboloy Tools you get Maximum Productivity!
The uniform high quality, consistent performance and long life of Carboloy Tools assure you of
★ Maximum production per machine
★ Maximum machine speeds
★ Maximum adherence to tolerances
★ Maximum tool life
★ Maximum pieces per tool
★ Minimum number of rejects
. . . advantages that add up to maximum productivity — plant wide.
Protective plastic coating not shown
IT PAYS TO STANDARDIZE WITH STANDARD CARBOLOY TOOLS
13,000,000
USED BY INDUSTRY
CARBOLOY®
CEMENTED CARBIDE
"THE LEAST NUMBER OF TOOLS

Specify STANDARD CARBOLOY TOOLS for low tool cost

VERSATILE Standard Carboloy Tools are comparable in price to many high-speed steel tools and in many sizes actually cheaper. You are assured of maximum economy in tool investment because Carboloy Standards are mass-produced under rigid quality controls to give you the highest quality at low investment costs.

And here are three other big reasons for choosing Carboloy:

Adaptability—they can be quickly and economically ground in your own tool room for a variety of jobs; eliminate the need for a large, costly inventory of special tools.

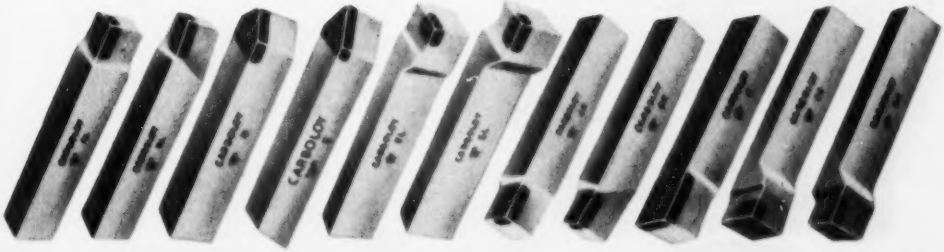
Universal Use—can be used in lathes, boring mills, etc., to machine any metal or nonmetal; for hundreds of single-point tool machining operations. Suitable for job lots or quantity production.

Greater Availability—Authorized Carboloy Distributors in 93 cities, coast-to-coast, carry stocks of Standard Carboloy Tools. In most areas off-the-shelf delivery of most styles and sizes normally can be made.

And you can add the advantages of simplified ordering, easy selection and versatile grades, plus the extra assurance that in the Carboloy brand of tools you get uniform quality in *every* tool . . . in *every* order . . . in *every* regrind.

CARBOLOY COMPANY, INC.
11143 E. Eight Mile Road, Detroit 32, Michigan

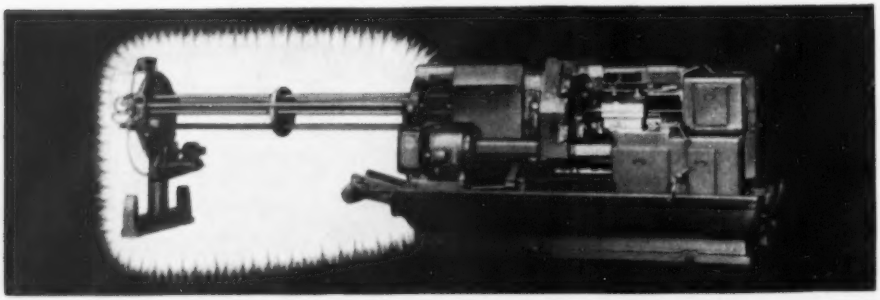
11 styles for 80% of your machining



STANDARD TOOLS

FOR THE GREATEST NUMBER OF JOBS"

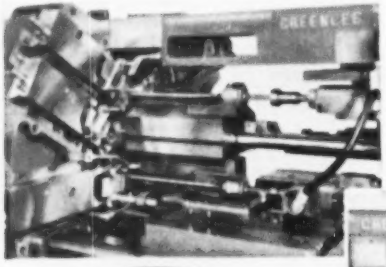
FEED OUT ANY LENGTH TO 16½" WITHOUT PUSHER MARKS!



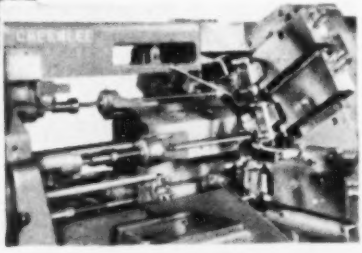
with GREENLEE AIR-FEED AUTOMATICS

Stock scoring — a necessary evil with conventional feed fingers — has often prevented certain jobs and materials from being handled on automatics, and has resulted in higher production costs. Now stock scoring can be completely eliminated by using Greenlee 1-inch 6-Spindle AIR-FEED Automatics which do away with the usual mechanical stock pusher arrangement. Instead of being gripped, the stock is moved forward smoothly and rapidly by an air-propelled piston in each stock reel tube.

There are other advantages, too. Quicker set-ups are possible by the elimination of stock pusher changes for different size stock. Multiple feed-out arrangements can be easily adapted, requiring only the setting of stock stops and collet openers at the desired feed-out positions. With only the air behind it, the stock will feed out in *any* of five positions to wherever the stop is set. On simple cut-off and form jobs, this permits production of 2 or 3 pieces per cycle. Investigate the Greenlee AIR-FEED for *your* shop.



Left, stations 1, 2, and 3 of a machine set up for multiple feed-out. The piece in this case is 16-3/32" long and requires only forming to a smaller diameter at one end. Live bushings ahead of the stops are used to prevent whipping.



Below, rear view of the same machine, showing positions 4, 5, and 6. The stock feeds out at positions 1, 3, and 5 and is formed. Cut-offs are at positions 2, 4, and 6 and chutes (not shown) are rigged to slide finished pieces away from the working area.

PRODUCTION MACHINERY

GREENLEE

GREENLEE BROS. & CO.

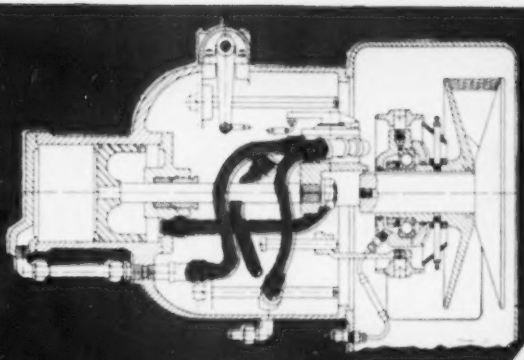
1891 MASON AVE., ROCKFORD, ILL.

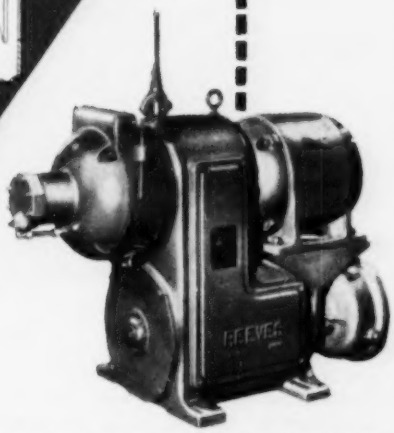
MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

Norgren Hoses in Reeves Motodrive Test Take

4,172,500 Operating Cycles

with no sign of failure!





"Like-new" condition after 7,727 hours continuous operation—equivalent of 8 years average service—this is the record of Norgren hose assemblies in a test made by Reeves Pulley Co., Columbus, Indiana.

Dependable hose performance is a "must" in Reeves Vari-Speed Motodrives™ for hydraulic or pneumatic automatic control of speed, tension, pressure or temperature.

SPECIFY NORGREN HOSE ASSEMBLIES...

...and get this extra quality for YOUR equipment. Reusable or permanent couplings; wide range of sizes of every pressure.

For Application Data Sheet No. 102, write C. A. Norgren Co., 235 Santa Fe Drive, Denver 9, Colorado

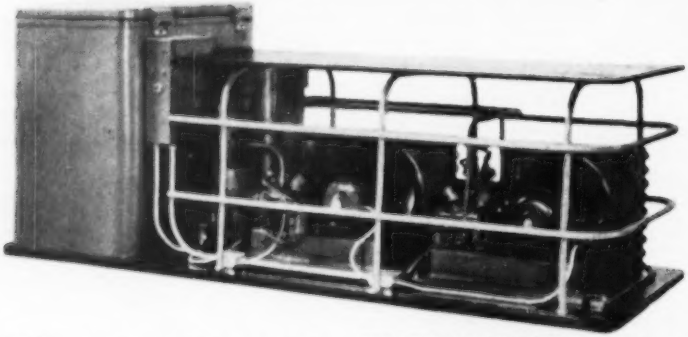
Norgren

LUBRICATORS, REGULATORS, VALVES, FILTERS, HOSE ASSEMBLIES

SHRINK METAL
TREAT TOOL STEEL
SEASON GAGES, ETC.
TEST METALS AND MATERIALS

WITH

SUB-ZERO CASCADE
INDUSTRIAL CHILLING MACHINE



SHRINK METAL — The new chilling machine has a shrinking effect on metal to provide a simple, fast method of assembling parts. Among other applications it is possible to assemble sleeve bearings and ball or roller races otherwise requiring a press fit by merely slipping into position after chilling.

TREAT TOOL STEEL — The Industrial Chilling Machine is used to treat metals to "condition" steel to produce combinations of greater hardness and strength.

SEASON GAGES, ETC. — Gage manufacturers use metal chilling for seasoning, setting and counter annealing gages, arbors, mandrels, etc.

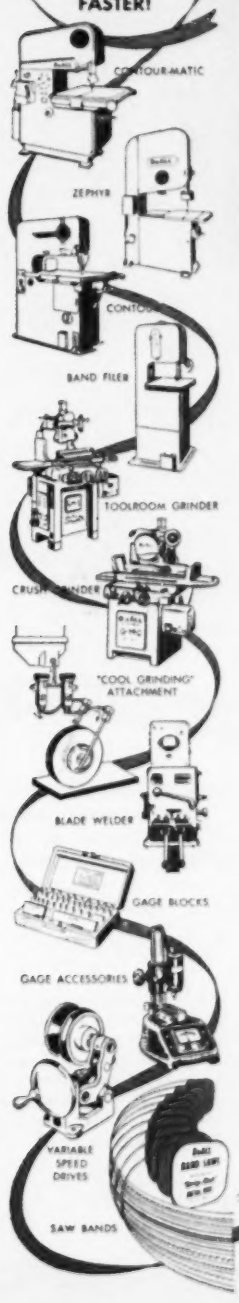
TEST METALS AND MATERIALS — By the aid of a transparent window you can observe the effect of sub-zero temperature on aircraft operating instruments, engine lubricants, radio receivers, rubber goods, etc.

OTHER USES — Sub-zero chilling units are finding applications in wide variety in the industrial field including metallurgy, chemical, plastic, paint, instrument testing, etc.

Write for complete information.

SUB-ZERO PRODUCTS DIVISION
OF
Deepfreeze Distributing Corp.
3932 READING ROAD CINCINNATI 29, OHIO

DoALL
TOOLS DO ALL JOBS FASTER!





Again GAGE BLOCKS Become "Strategic" Equipment

Production depends upon unfailing interchangeability of parts — accomplished *only* through the use of accurate gage blocks.

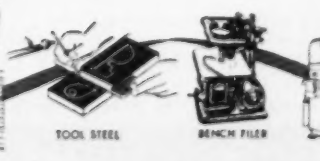
Your Local DoALL Representative has a Kit to Prove the Superiority of DoALL Gage Blocks —

1. Surface finish superior to any other gage block — three-tenths of one micro inch RMS or better
2. Burr-Proof edges (exclusively DoALL) prevent formation of nicks and burrs during usage
3. Guaranteed stability that prevents "growing" and "shrinking"
4. More uniform hardness — between 65 and 66 Rockwell C
5. Flattest and most parallel gaging surfaces — plus or minus .000003"
6. Fitted in most convenient, easy-to-use carrying case
7. Priced lower than ordinary gage blocks
8. All gage blocks are subject to change and wear, and must be inspected regularly. DoALL has a complete inspection and calibration service, plus a completely integrated set of gage block accessories, to increase the usefulness of gage blocks

***Therefore,* DoALL GAGE BLOCKS**

- **HAVE THE MOST RELIABLE ACCURACY**
- **ARE EASIER TO WRING TOGETHER**
- **LAST LONGER**

Get the proof from your DoALL man. Write us today!



The DoALL Company
Des Plaines, Ill., U.S.A.
Cable Address: DoALL, Des Plaines

DoALL Stores in Key Cities

Factory Trained Representatives Everywhere

PRODUCTION ..the Call of the Hour!

GET IT WITH MOTCH & MERRYWEATHER *Automatic* Circular Sawing Machines!





For cutting off ferrous or non-ferrous stock up to 24" length and 4" diameter, round or square.

Material ..... SAE 1020
Size ..... 4" dia.
Sawing Time ..... 50 seconds

Material ..... SAE 1020
Size ..... 3" I-Beam
Sawing Time ..... 22 seconds



Material ..... SAE 1020
Size ..... 1-¾" x 3"
Sawing Time ..... 20 seconds



Material ..... SAE 1020
Size 3" O.D. x ⅝" wall
Sawing Time ..... 28 seconds

SPEED • ACCURACY • SQUARE ENDS • LOW COST

Higher production lowers your cost per cut-off piece, together with extreme accuracy which eliminates many second operations. This little giant of production will save you money in tool costs and get your work out faster.

Investigate! Ask for Bulletin No. 150-D.

★ ★ ★

Look to Motch and Merryweather for production cut-off machines handling stock from ¼" through 18" diameter, as well as machines for special applications, including sawing with simultaneous second operations. M. & M. builds circular sawing machines, automatic saw sharpeners and circular saw blades, transfer and special machines.

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION WITH ACCURACY MACHINES AND EQUIPMENT



ARISTOCRAT OF WORK BENCHES

. . . built for men accustomed to the finest tools and equipment

We "pulled out all the stops" when we designed the HALLOWELL Cabinet Bench, giving it more "custom" features than any other stock bench we know of. All-steel construction, choice of top materials, ample storage space, standard units, interchangeable accessories, and trim good looks are a few of its advantages.

WORTH WAITING FOR

Bulletin 702 tells the story. Write for your copy today!

Steel shortages are delaying deliveries, but we think you'll find them . . .



NEW! HALLOWELL UNI-TRUK HAND TRUCKS

Available with one or two handles. Send for form 757-1. TRY ONE AND YOU WILL BUY MORE!

Patent Applied for

Work Benches
Foreman's Desks
Tool Stands
Platform Trucks

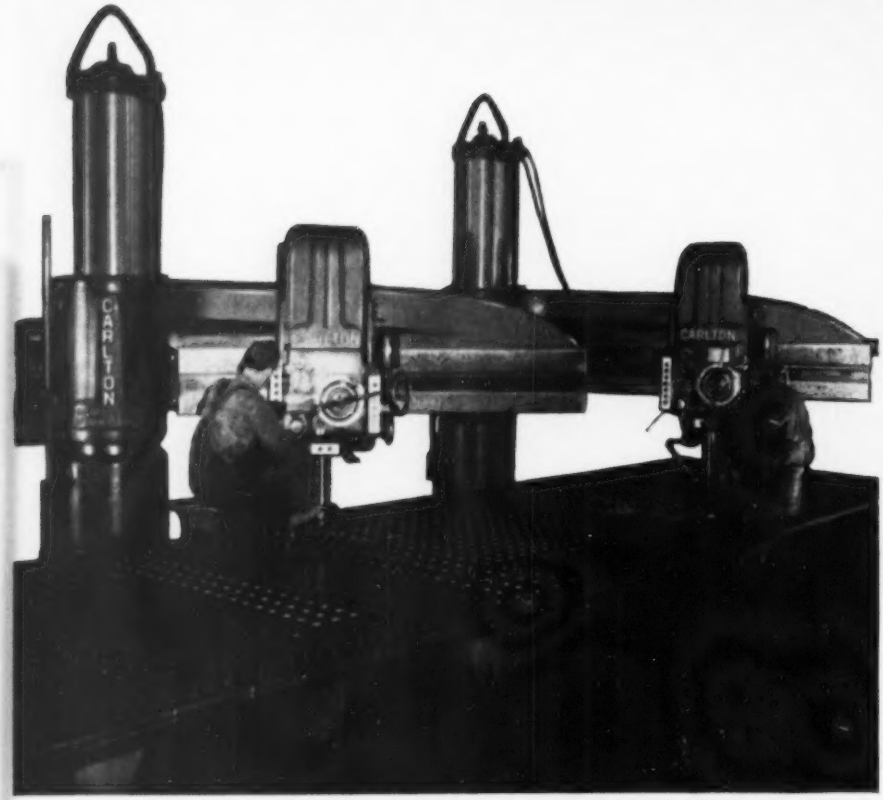
HALLOWELL

SHOP EQUIPMENT OF STEEL

Posture Stools
Posture Chairs
Cabinets
Folding Tables

SPS STANDARD PRESSED STEEL CO.

JENKINTOWN 22, PENNSYLVANIA



for LARGE-AREA *drilling and boring . . .*

rely on CARLTON RADIALS

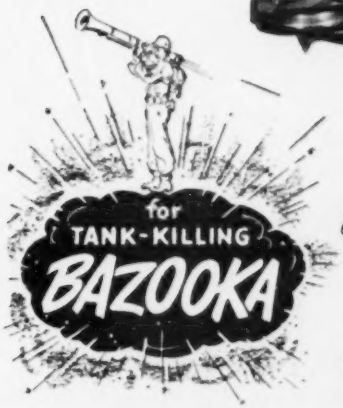
IT'S a cinch that when drilling and boring extends over a big area, Carltons do the job better. Use them in tandem like the two Carlton 4-A radials shown above drilling and boring boiler plate . . . or perhaps a single Carlton with track-type mounting would be better for your requirements. Either way, Carltons . . . with their easy, push-button operation and rugged construction . . . are your best radial investment. Get the "hole" story, send today for descriptive bulletins.

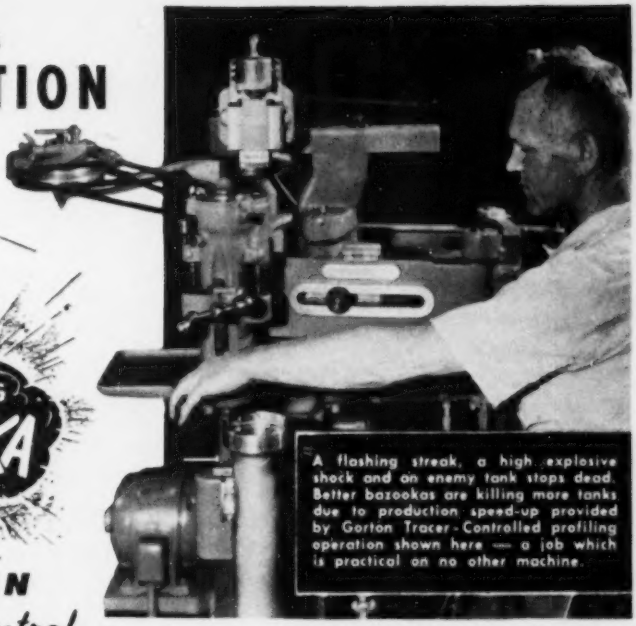
THE CARLTON MACHINE TOOL CO.

CINCINNATI 25, OHIO

THE CARLTON MACHINE TOOL CO.

Faster
PRODUCTION




A flashing streak, a high explosive shock and an enemy tank stops dead. Better bazookas are killing more tanks due to production speed-up provided by Gorton Tracer-Controlled profiling operation shown here — a job which is practical on no other machine.

GORTON
Tracer-Control

• SPEEDS PRODUCTION • CUTS COSTS

On many all-but-impossible jobs, Gorton Tracer-Controlled Pantographs and Duplicators speed up production on military or industrial contracts. High surface finish results from spindle speeds up to 45,000 R.P.M. Accuracy results from the use of over-size masters, patterns, or templates together with the reduction ratio which is exclusively characteristic of the pantograph. Whether a dozen or a thousand pieces, each is identical to the first. Work piece size varies from instrument parts to areas of 10 to 20 feet.

Gorton tracer-controlled equipment quickly pays for itself in profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving as well as many other standard or special operations on ferrous or non-ferrous metals and plastics where work is flat, uniformly curved, cylindrical, spherical or irregular in shape.

Mail the coupon below for General Catalog illustrating the complete Gorton line.

PRODUCTION DATA—

JOB: Profile 6 locking lugs for male and female sections of new 3.5" Bazooka
MATERIAL: Aluminum alloy
CUTTER: 5/32" dia. single flute, fast spiral H. S. steel running at 3,900 R. P. M., without coolant
MASTER: 2 masters: one for male and one for female sections; 3 times oversize, traced manually
HOLDING FIXTURE: Pneumatic-operated internal expanding type
APPROX. TIME: 36 pieces per hour
ALTERNATE METHODS: None practical



Please send at once complete information about the Gorton line contained in Bulletin **1655-1711.**

Firm .....
Name .....
Title .....
Address .....
City, State .....

Select NIAGARA

NIAGARA RING AND CIRCLE SHEAR

- Circular blanks of various diameters and thicknesses are quickly and accurately cut.
- Initial cost and maintenance of blanking dies is eliminated.
- Wide range of sizes can be produced in the circle shear with less set-up time than is required for setting up a blanking die.
- Sturdy construction insures minimum maintenance costs.
- The size of the blank can be easily changed to accomplish the results required in the drawing operation. No development work on blanking dies is necessary.

For instance, in the Buffalo Plant of American Machine & Foundry Company a NIAGARA Ring and Circle Shear is teamed up in economical production with a NIAGARA Double Crank Press making aluminum restaurant equipment.



Cutting 22" diameter blanks out of 1/8" aluminum on Niagara Ring and Circle Shear

NIAGARA MACHINE & TOOL WORKS · BUFFALO 11, N. Y.

Machines which suit YOUR Production Requirements

NIAGARA DOUBLE CRANK PRESS

★ The use of Niagara pneumatic cushion permits drawing operations in a single action press.

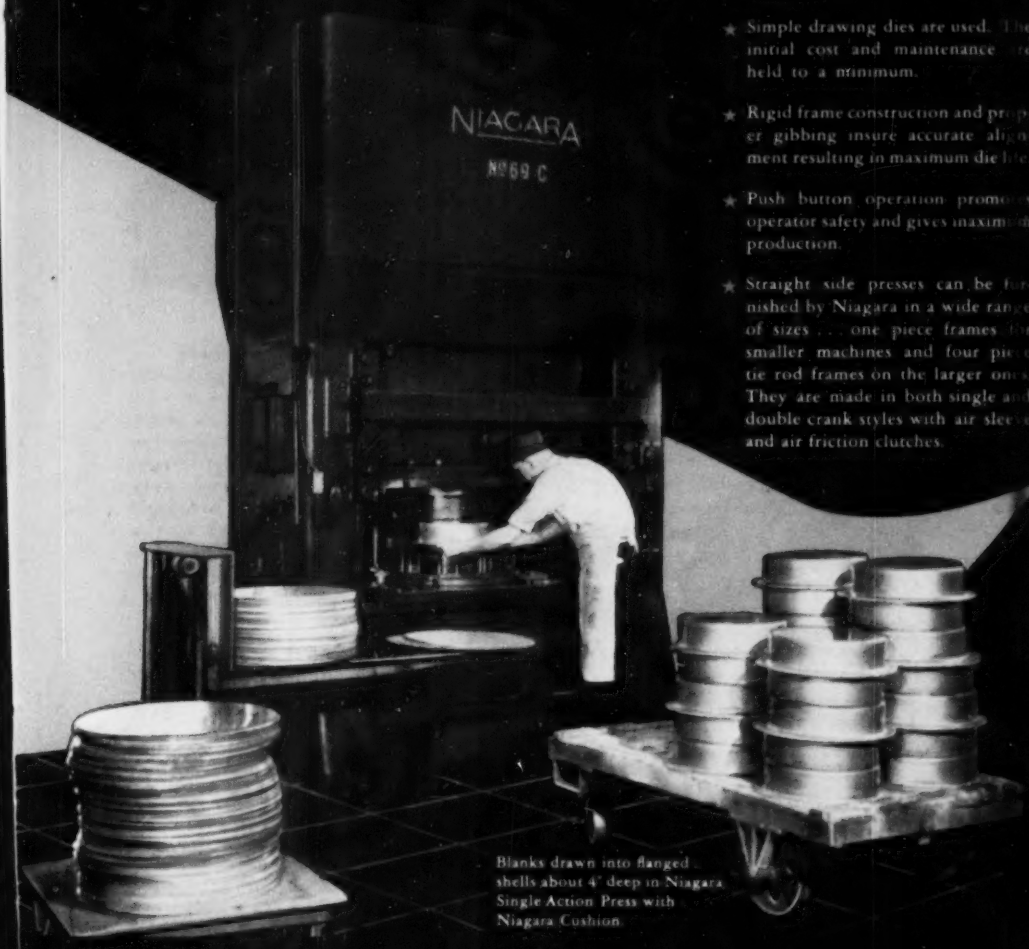
★ Less set-up time is required than in a double action press where two slides must be adjusted for each thickness.

★ Simple drawing dies are used. The initial cost and maintenance are held to a minimum.

★ Rigid frame construction and proper gibbing insure accurate alignment resulting in maximum die life.

★ Push button operation promotes operator safety and gives maximum production.

★ Straight side presses can be furnished by Niagara in a wide range of sizes . . . one piece frames for smaller machines and four piece tie rod frames on the larger ones. They are made in both single and double crank styles with air sleeve and air friction clutches.



Blanks drawn into flanged shells about 4" deep in Niagara Single Action Press with Niagara Cushion.

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK

America's Most Complete Line Presses, Shears, Machines and Tools for Sheet Metal Work



"IS YOUR PROBLEM ...HOW TO CUT PRODUCTION COSTS"

THE ANSWER IS ....

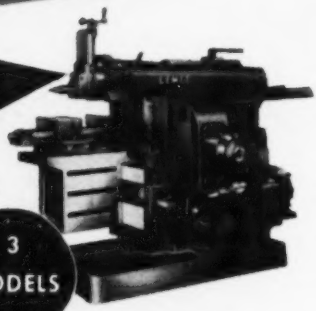
MODERNIZE...

with GEMCO

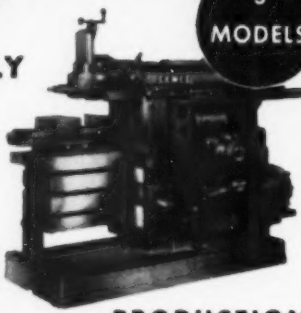
MATCHED FOR THE JOB

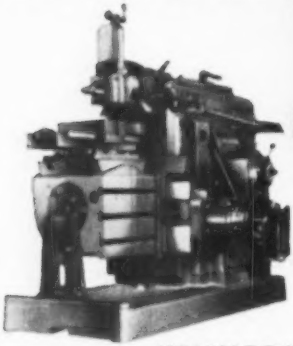
PRECISION SHAPERS

and BEAT COSTLY OBSOLESCENCE!



3 MODELS





PLAIN

For average machine shop use and light production work. Available in sizes from 16-in. heavy through 20-in. heavy duty. Equipped with plain table and with or without Front Table support. LUBRIGARD protected.

PRODUCTION

Indicated for general machine shop use and heavy production work. In sizes from 16-in. heavy duty to 36-in. standard duty and with separate Table and Apron and with Front Table support. LUBRIGARD protected.

UNIVERSAL

Indicated for tool and die work and general machine shop work requiring frequent changes and angular settings. In sizes from 16-in. heavy duty to 36-in. standard duty, with Front Table support. LUBRIGARD protected.

●

WRITE FOR BULLETIN GC-135

●

• THEY'RE LUBRIGARD PROTECTED

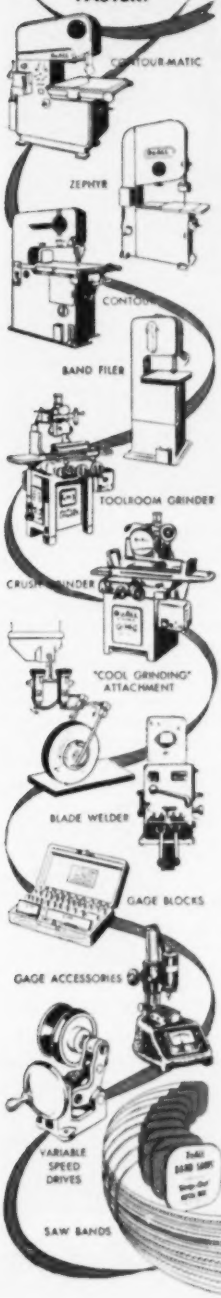
GENERAL ENGINEERING & MFG. CO.

MANUFACTURERS OF PRECISION MACHINERY SINCE 1917

4417 OLEATHA AVE. • ST. LOUIS 16, MO.

DoALL

TOOLS DO ALL JOBS FASTER!



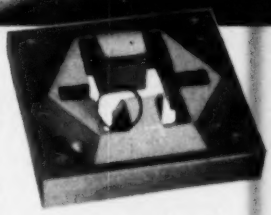
NEW MACHINING TECHNIQUE *Line-Grinding*



It is now possible to do rapid machining and shaping of HARDENED STEEL and extremely ABRASIVE or BRITTLE MATERIALS with spectacular new, low-cost Band Tools developed for use on the DoALL Contour-matic.

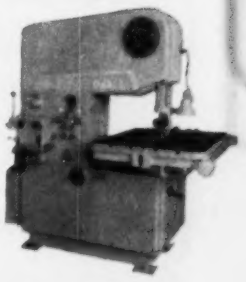
Vertical Line-Grinding and Honing as done by the hydraulically operated Contour-matic and this new DoALL Band Tool offer you these advantages:

1. **Machines without length or depth of cut limitations**
2. **DoALL Line-Grind Bands come in various grit sizes of aluminum oxide or silicon carbide, to facilitate machining operations previously impossible**
3. **Accurate machining to either straight or curved layout lines**
4. **Internal as well as external machining. For internal cut-outs, the Line-Grind Band is threaded through a starting hole in the work and rewelded**



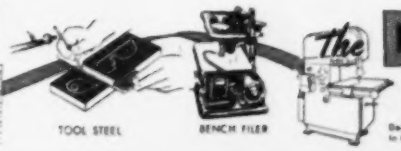
Broken die salvaged at low cost by replacing the damaged section after its removal by Line-Grinding. It required only 6 minutes to remove a square inch of Kotos steel hardened to 59 Rockwell C





WATCH THEM WORK!

Our Line-Grind demonstrator units are available to show you this new time-saving technique. Write today for free demonstration in your own plant.



The DoALL Company

Des Plaines, Ill., U.S.A.

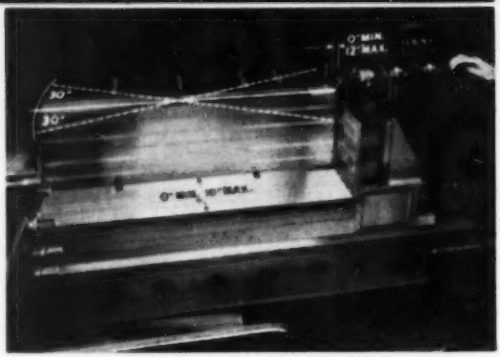
Cable Address: DoALL, Des Plaines

DoALL Stores in Key Cities

Factory Trained Representatives Everywhere

How To Save Time
IN YOUR MILLING DEPARTMENT WITH A SUNDSTRAND GENERAL PURPOSE MAGNETIC FIXTURE

Here's a new work-holding fixture for general purpose milling work. It saves on miscellaneous milling jobs by eliminating time losses for adjusting mechanical clamps and the cost of special jigs or fixtures. It is a complete unit with Sundstrand Magnetic Chucks mounted on an adjustable fixture. Chucks are quickly positioned as required by the size of work piece and easily adjusted for angular milling cuts. If you have miscellaneous milling jobs requiring frequent changeover from one part or cut to another, it will pay you to



Sundstrand Magnetic Fixture showing adjustments. Note clamping is performed by merely throwing switch.

investigate the savings possible with this new magnetic holding fixture. Sundstrand Magnetic Chucks are operated with an automatic demagnetizing control. There is no tube in rectifier to burn out. Generally, the input of the control unit is 110 volt A.C., which is rectified to 6 volt D.C., which in turn energizes the chuck. The low voltage eliminates possibility of shock to the operator, and no heat is produced to affect accuracy. Controls with inputs other than 110 volt A.C. can be furnished when required.







TYPICAL SET-UPS

These three set-ups illustrate only three of many different parts that are being run over one general purpose magnetic fixture in the manufacturer's plant.

•

Top — Milling steel tool blocks. Parts are run in lots of one to ten and are machined all over.

Center — Milling three steel cam bars simultaneously. Bars are 33⅝" long x 2½" wide and 1¼" thick and are milled all over in six operations.

Bottom — Milling cast iron motor bracket slide. Part is held for eight different cuts with same fixture.

FREE
Additional Data

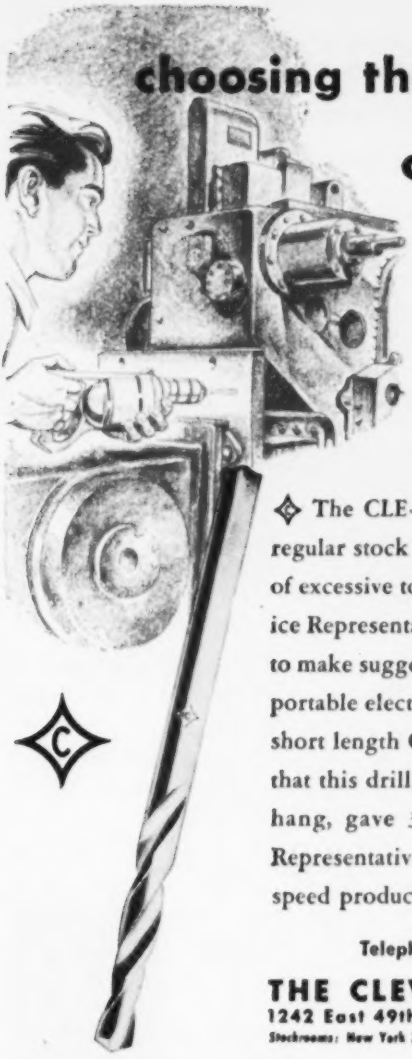
Complete information on Sundstrand Magnetic Chucks Will be sent on request. Ask for bulletin 502-M.



SUNDSTRAND MAGNETIC POWER-GRIP **CHUCKS**

SUNDSTRAND MAGNETIC PRODUCTS CO.
A Division of Sundstrand Machine Tool Co.
1306 18th AVENUE • ROCKFORD, ILLINOIS

choosing the right stock drill cuts tool cost 33%



Test Shows This Drill Gives *Best Performance*

The CLE-FORGE High Speed Drill shown here is a regular stock item . . . yet it successfully solved a problem of excessive tool breakage. Recently a *Cleveland* Service Representative was called into a large automotive plant to make suggestions on the proper types of drills for use in portable electric drills. He recommended a switch to the short length CLE-FORGE High Speed Drill. Tests proved that this drill, because of its heavier web and small overhang, gave *33% longer life.* A *Cleveland* Service Representative may be able to help *you* cut tool costs and speed production. Contact our nearest Stockroom, or . . .

Telephone Your Industrial Supply Distributor

THE CLEVELAND TWIST DRILL CO.

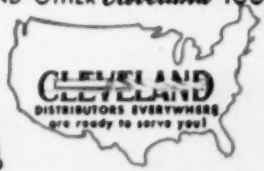
1242 East 49th Street • Cleveland 14, Ohio

Stockrooms: New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5 • Los Angeles 58

E. P. Barrus, Ltd., London W. 3, England

ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER *Cleveland* TOOLS

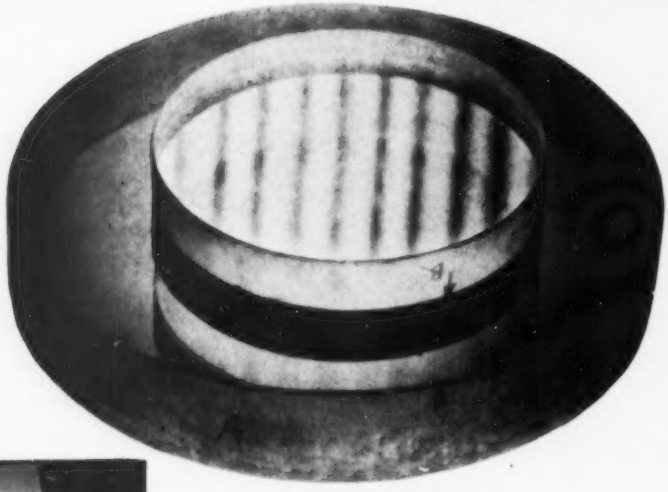




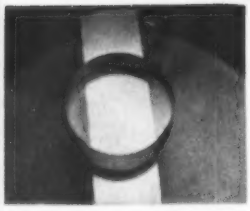
Van Keuren ... OPTICAL FLATS

are the proof of Precision

BOSTON ◉——



——◉ NEW YORK



Detecting worn spot on amplifying gage anvil.

IF the 10" diameter Van Keuren Master Flat shown above were extended from New York to Boston, the surface would deviate from a true plane less than 1".

Insist on having Van Keuren Fused Quartz Optical Flats. They are beautifully finished and are of superlative accuracy on both sides. They are the best buy.



Checking flatness of lapped shoulder on a shaft with a special 3" diameter x 29/32" hole Fused Quartz Optical Flat.

IF YOU HAVE A PROBLEM of testing flat surfaces, send us a sample part for examination and report.

This 208 page volume represents 2 years of research sponsored by the Van Keuren Co. It presents for the first time in history a simple and exact method of measuring screws and worms with wires.

It tells how to measure gears, splines and involute serrations. It is an accepted reference book for measuring problems and methods.



Copies free upon request.

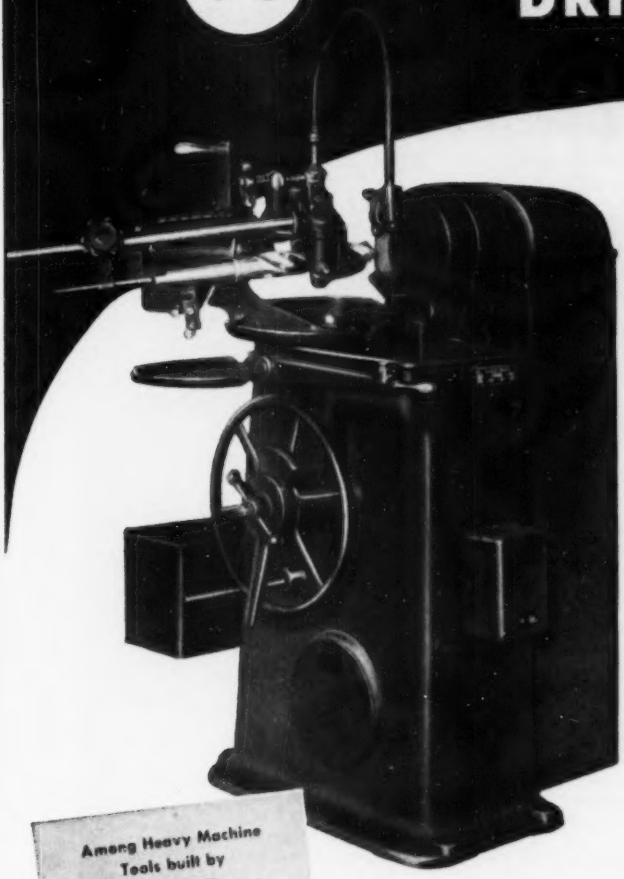
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31st Year

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbaloy Plug Gages • Carbaloy Measuring Wires

MODEL
6-G

SELLERS DRILL GRINDER



QUICKLY PAYS FOR ITSELF IN DRILL MAINTENANCE SAVINGS

- **INCREASED PRODUCTION**
  Free cutting accurate drills permit drilling machines to be operated at their most efficient speeds.
- **LONGER DRILL LIFE**
  Less drill material is ground off when re-sharpening drills.
- **MORE HOLES PER GRIND**
  Correctly ground—drills remain sharp for a greater number of holes.
- **REDUCED ASSEMBLY COSTS**
  Eliminates under- and over-size holes. Saves reaming and boring.
- **RECLAIMS DAMAGED DRILLS**
  Sellers grinding method reclaims many burned and broken drills that are ordinarily scrapped.
- **ECONOMICAL**
  This Sellers Grinder has been known to have earned its original cost as many as six times over within a single year.

Among Heavy Machine Tools built by Consolidated are . . . .

LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
COLD SAW MACHINES
BORING, DRILLING AND MILLING MACHINES
DRILL AND TOOL GRINDERS
PLANERS
SLOTTERS
RAILROAD SHOP TOOLS
AUTOMOTIVE TOOLS
AND OTHER
SPECIAL MACHINES

The Sellers 6-G Drill Grinder provides an improved method of grinding that produces correctly formed drill points and duplicate lips. It automatically determines proper clearance according to drill size and grinds drills to equal length for use with multiple spindle drilling machines. This method materially reduces drill maintenance costs. A wet grinder that is especially adapted to grinding high speed twist drills from ¼" to 3" diameter.

Send for complete information

BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1848

BETTS • BETTS-BRIDGEFORD • COLBURN • HILLES & JONES • MODERN • NEWTON • SELLERS

CONSOLIDATED MACHINE TOOLS

CONSOLIDATED
MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK



The Right Combination

YOUR BLANCHARD
BLANCHARD WHEELS
BLANCHARD SERVICE

Blanchard Wheels for Blanchard Grinders are designed and manufactured under the same supervision which for one-third of a century has produced Blanchard Surface Grinders.

Those years of experience are available to help Blanchard users get the utmost in Service from their Blanchards.

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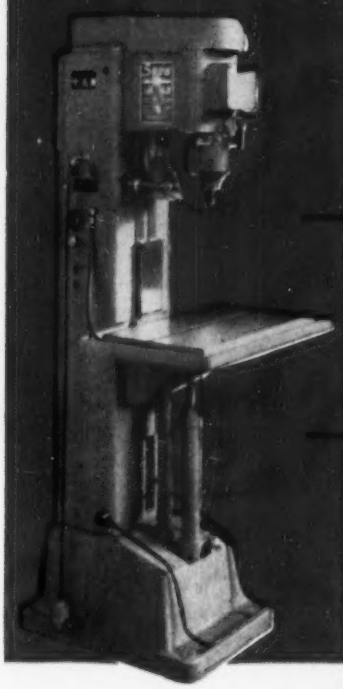
The BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE 39, MASS. U. S. A.

SNOW

FULL UNIVERSAL MACHINES

Air operated, electrically controlled Snow tools are establishing amazing production records daily on a wide variety of work. Just note these typical examples:

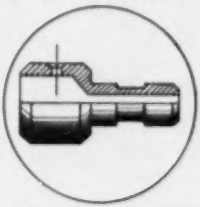
For Top Production



DRILLING

Crossdrill and C'T" Sink 1/16" Hole

Material—Brass
Production—4800 per hour
Fixture—#15 Vertical index
Equipment—#1-UD Drilling Machine



TAPPING

Tap Two #10-32 Holes

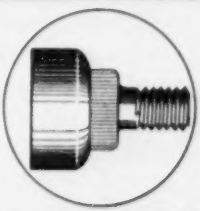
Material—Steel stamping
Production—3800 tapped holes per hour
Fixture—#14 horizontal index
Equipment—#1-UT tapping machine



THREADING

3/8"—24 Thread—1/2" Long

Material—Die Cast Aluminum
Production—2500 per hour
Fixture—#10 Drum dial
Equipment—#3-TR Threading machine



Snow air operated—electrically controlled machines have built in full universal controls that allow selection of the type of spindle cycle desired. This feature also permits instant synchronization of the standard Snow Master Fixtures. All types of air operated automatic and semi-automatic jigs and fixtures are carried in stock. Standardization permits low cost tooling—and—high production.

Sensitivity of power application prevents tool breakage.

Simplicity of control means that set up and operation can be handled by a less experienced operator with minimum fatigue.

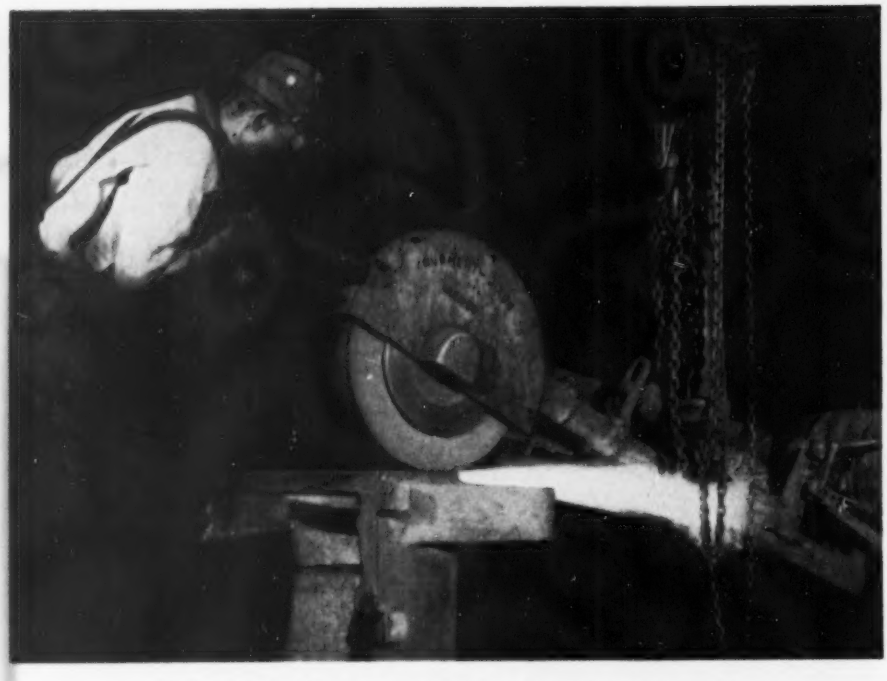
SNOW

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Single Spindle Verticals • Two-Spindle Verticals • Two-Spindle Horizontals • Automatic Nut Tapping Machines • Drill Press Tap Heads • Automatic & Semi-Automatic Jigs & Fixtures

Submit Sample Parts for Production & Cost Estimates



MANHATTAN Abrasive Wheels For Heavy High-Speed GRINDING

Custom engineered for your job, Manhattan Abrasive Wheels cut cost and speed production on all grinding operations.

Exclusive Manhattan developments in both Rubber and Resinoid Bonding assure you production economies of fast metal removal with long wheel life.

Ask to have a Manhattan Field Engineer call at your plant. His suggestions may well mean more production—faster—at less cost. There is no obligation.

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RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

Where "SMALL WORK" GRINDING JOBS are concerned

Depend on Foredom FLEXIBLE SHAFT MACHINES

for TOP PERFORMANCE VERSATILITY and SPEED!



Quality Tested Since 1922

Model 9050

ONLY $29.60

COMPLETE with 6-STEP FOOT RHEOSTAT and PENCIL-SIZE HANDPIECE



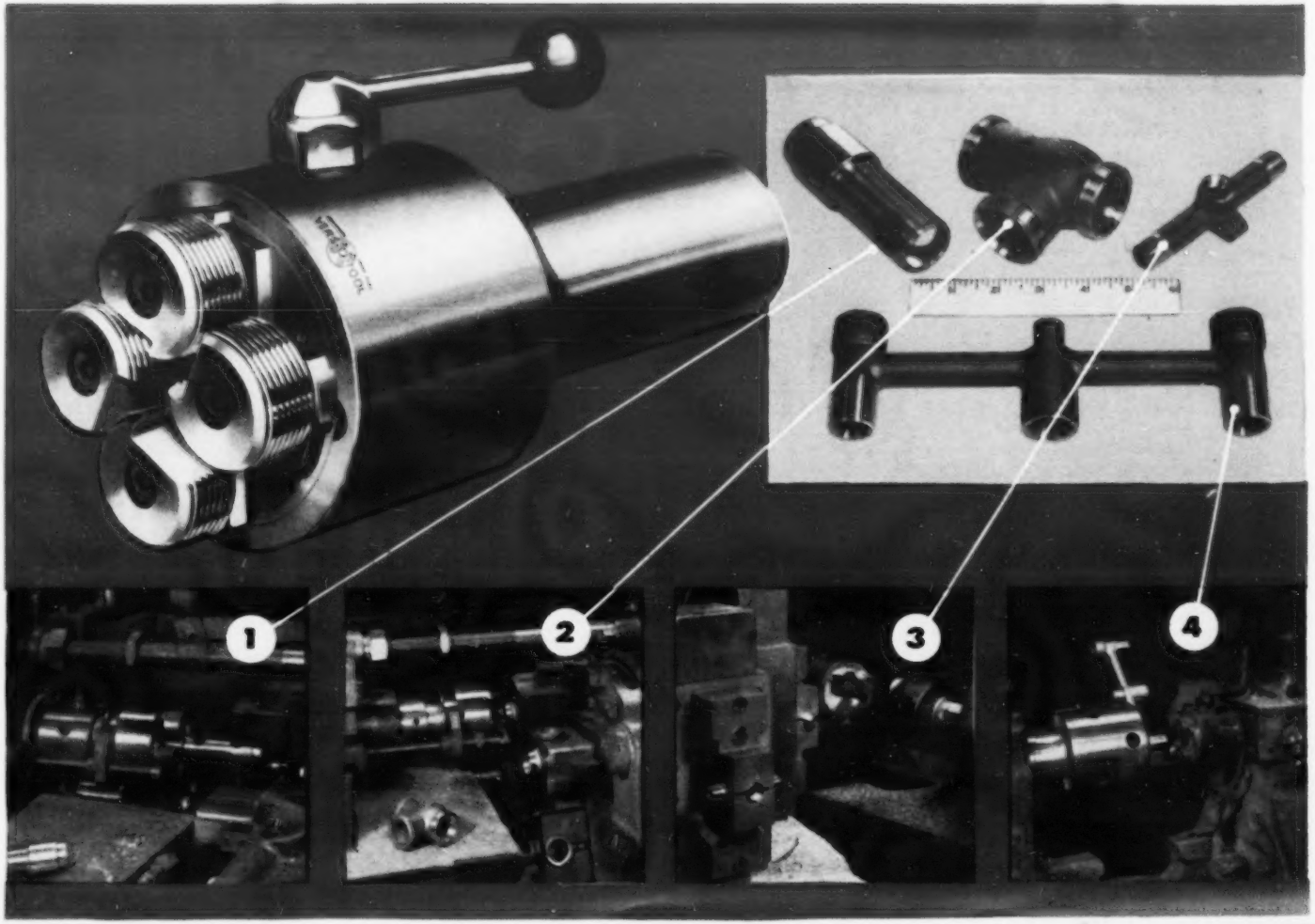
Bench and Hang-Up Models, also models like Model 9050 *(illustrated)* which can be hung up, set on bench or mounted under bench. 5 Handpiece types, pencil-size or larger, all with quick-detachable feature. Extra good flexing qualities provide utmost freedom of movement in handpiece.

- **Foredoms are profitable additions to all three departments — Production, Tooling and Maintenance.**
- ***See Your Industrial Supply Distributor. If he cannot supply you write to us. Mail coupon for catalog.***

FOREDOM ELECTRIC CO., Dept. B-2135
27 Park Place, New York 7, N. Y.

Send your catalog No. B-2135, showing different uses of Foredom Flexible Shaft Machines.

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4

AT REPUBLIC BRASS COMPANY, THEY CHOOSE VERS-O-TOOL

for the tops in dollar performance—in threading production

Faster machining times, lower chaser costs, less tool inventory, greater accuracy—These are just some of the reasons why Vers-O-Tools are the number one choice for fast, economical, precision threading at plants like Republic Brass.

Each of these pluses is directly traceable to the exclusive basic design features of the Namco Vers-O-Tool, including:

CIRCULAR CHASERS—regrindable through a full 270°, for 10 to 50 times longer life.

INTERCHANGEABILITY of chasers, size for size, on all three types of Namco Vers-O-Tool heads keeps tool inventory at an economical minimum.

ACCURACY of thread form, throughout the life of the circular chaser, is assured by exclusive direct micrometer check after each regrind. With Vers-O-Tools you can count on precision threads and smooth finish.

• • •

For complete details on Vers-O-Tool's time-saving, money-saving features, ask for Catalog D-49.

JOB FACTS

1. 1 7/16"-18 straight thread—200 per hour—class 2 fit with 1 3/8" D.S. Circular Chaser Vers-O-Tool.
2. 1½"—11½ pipe thread—450 per hour—class 2 fit with 1 3/8" D.S. Circular Chaser Vers-O-Tool.
3. ⅜" pipe thread—250 per hour both ends—class 2 fit with 1" D.S. Circular Chaser Vers-O-Tool.
4. 1"—20—3 seconds each end—class 2 fit with 1" D.S. Circular Chaser Vers-O-Tool.

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170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing



2160 Holes *Per Hour!*

WITH SPECIAL

Atlas DRILL PRESS SET-UP

If you're looking for a fast way to drill small parts, it will pay you to investigate Atlas Drill Presses. Atlas speed, ruggedness, accuracy, and all-round dependability team up efficiently with special fixtures for profitable production drilling.

For example, General Gas Light Co. of Kalamazoo, Mich., uses an Atlas Drill Press with automatic feeding device to drill 4 holes in brass valves at the rate of 9 pieces a minute—2160 holes per hour!

A cam in the feed mechanism, designed by General, drives a rack which operates a pinion connected to the drill press feed spindle. In production, the operator simply positions the work—the Atlas and the automatic feed do all the rest. In another drilling operation, an Atlas with the same type automatic feed drills a $\frac{3}{8}$" hole, $1\frac{1}{4}$" deep, in brass at the rate of 660 per hour.

There may be dozens of such profitable uses for Atlas drill presses in your production. Send for a catalog today.



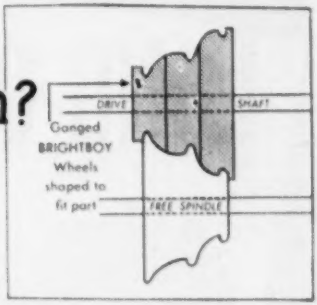
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ATLAS PRESS CO.
1146 N. PITCHER ST.
KALAMAZOO, MICH.

ABRASIVE *PLUS* RUBBER . . . The Soft Rubber Binder *Cushions* the Abrasive



Need a Contour Finish?



Convex, concave, or any combination? On metal, wood, glass or plastics products or parts?

Try BRIGHTBOY. Brightboy wheels can be ganged and shaped quickly — as can Brightboy blocks—to the curvature of any product to be contour-finished.

WHEELS, STICKS, RODS, BLOCKS, *for machine and manual operations*

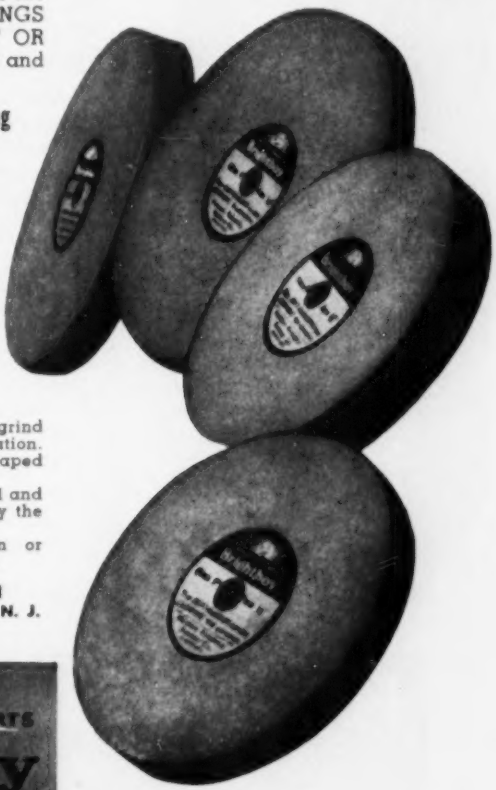
Brightboy adaptability goes far beyond contour-finishing. It's so smooth that it will frequently serve as the "final". AND AT WORK-TIME SAVINGS AMOUNTING TO FIFTY PER CENT OR MORE! Reason: Brightboy's abrasive and rubber do the job:

Burring • Finishing • Cleaning • Polishing
in one operation

No skilled labor is needed to handle Brightboy. It requires no special preparation or dressing before use. Ask your dealer about Brightboy. Try it. Get the Brightboy Catalog-Manual. Write the Brightboy Service Department on any problem where methods or production are involved.

What Abrasive-Plus-Rubber Brightboy Does:

1. Bridges the gap between the rough grind and the buff, frequently in one operation.
2. Works to close tolerances; can be shaped to contour.
3. Produces a wide variety of conventional and special finishes and patterns; frequently the final polish.
4. Requires no before-use preparation or dressing; no skilled labor to handle it.



BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO., Newark 7, N. J.
America's Pioneer Manufacturers of Rubber Bonded Abrasives

WELDON ROBERTS
Brightboy

FOR FINISHING ALL METALS, WOOD, GLASS, PLASTICS PRODUCTS and PARTS

LONG ON QUALITY SHORT ON PRICE

KRW HYDRAULIC PRESSES



By any standard of comparison, the proven fact is: you pay far less in dollars and get far more in performance when you insist on a KRW Hydraulic Press. The specifications prove it's true, so do performance records, and so do the expert opinions of KRW owners. The price tag tells you one thing—the dollars you save. The unexcelled quality standards tell you another—the dollars you'll make! You should get both when you buy! Write or wire for the full facts and prices!

TWO CYLINDER TYPE

Tons capacity: 60, 85, 100. Platen and bolster, maximum usable size: F to B, R to L, 36" x 60". Stroke 6", 11". Bed, fixed. Controls: Manual, Semi-Automatic, Fully Automatic for cycled operation.

BRIEFED SPECIFICATIONS

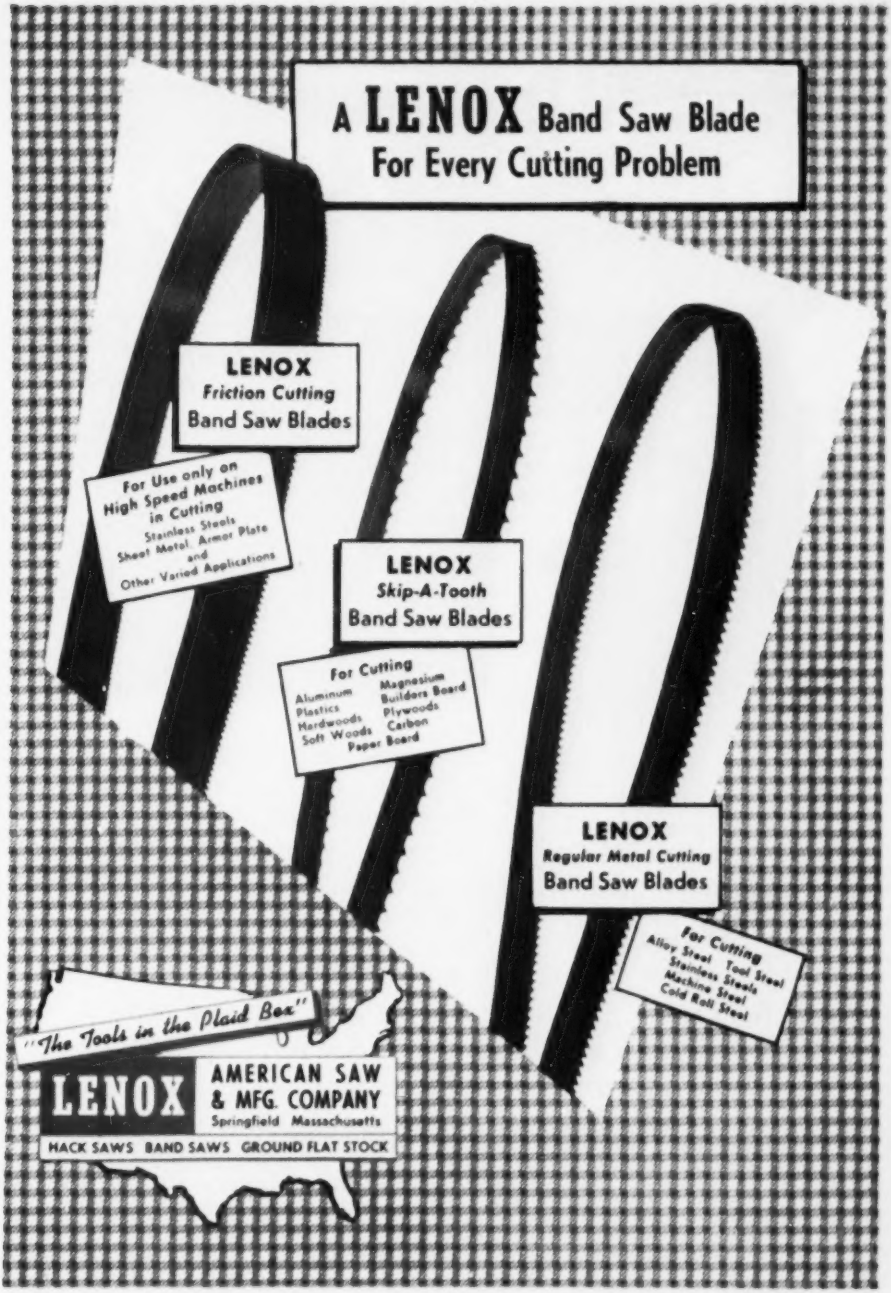
KRW presses are self-contained and fabricated of steel for maximum strength, minimum weight, and space conservation. Precision honed cylinders. Adjustable limit switch for top return position of ram. Adjustable tonnage pressure control. Safety by-pass prevents over-loading beyond maximum rated capacity. Large self-contained oil reservoir. Direct connected motor drive to pumps through easily serviced flexible couplings. Safety controls prevent accidents. Long bronze faced gibs adjustable for wear insure accurate travel of slide. Quiet and vibrationless in operation. Presses can be custom built to meet your manufacturing requirements.

Write or wire for full facts and prices.

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A LENOX Band Saw Blade
For Every Cutting Problem
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Friction Cutting
Band Saw Blades
For Use only on
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Stainless Steels
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HACK SAWS BAND SAWS GROUND FLAT STOCK

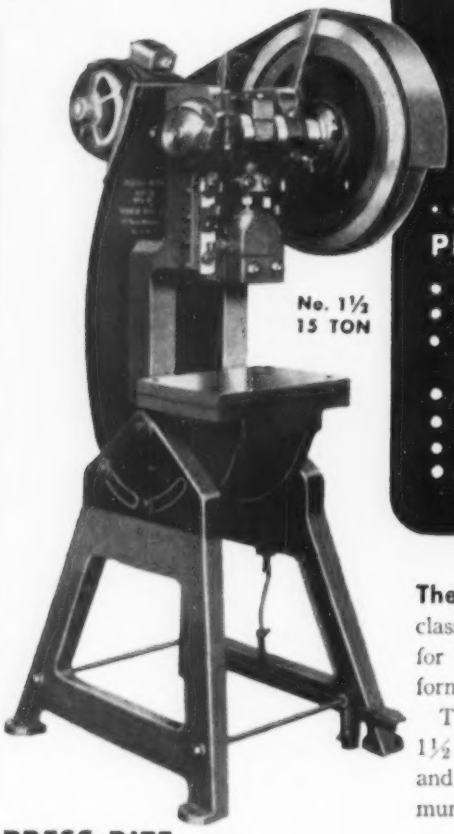
PRESS-RITE

PRESENTS ITS *NEW...*

15 ton POWER PRESS

. . . with all the famous PRESS-RITE FEATURES

- HEAVY UNI-CAST FRAME
- 4 POINT SLIDING KEY CLUTCH
- NON-REPEAT SINGLE STROKE MECHANISM
- TRIPLE RAM WAY LUBRICATION
- AUTOMATIC CAM ACTUATED BRAKE
- ANTI-FRICTION ROLLER BEARINGS
- GREATER SHUT HEIGHT



The NEW PRESS-RITE 1½ is a giant in its class. Its uni-cast special alloy frame is built for the hardest jobs of blanking, punching, forming, stamping and drawing.

The many features of the PRESS-RITE 1½ set a new standard for high production and low maintenance combined with a maximum of safety.

PRESS-RITE POWER PRESSES are built in sizes from 5 to 85 tons!

Keep your shop up-to-date with a PRESS-RITE!

WRITE TODAY FOR FULL INFORMATION.

Sales Service Machine Tool Co.







2363 UNIVERSITY AVENUE
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PLANERS BORING MILLS SHAPERS

QUICKLY CONVERTED TO DUST-FREE GRIT-FREE GRINDERS

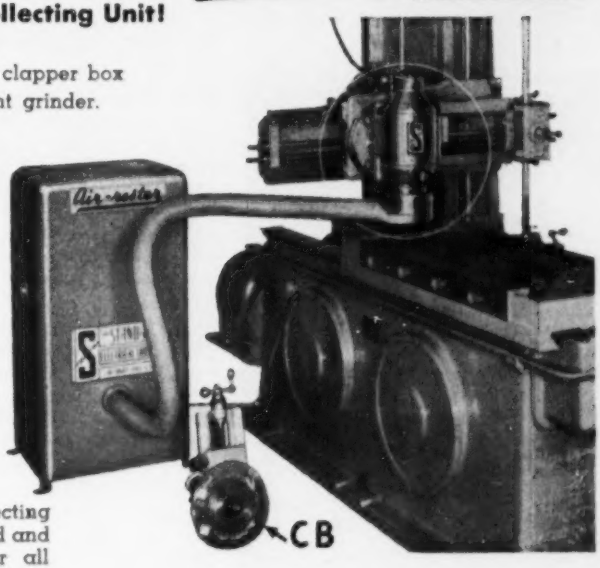
with THE STANDARD

Type PAV Vertical Spindle Grinder; Telescopic Wheel Guard; "Air-Rester" Dust Collecting Unit!

METHOD: Simply remove clapper box "CB" and mount grinder.

Investigate this STANDARD time and money saving combination today!

TYPE PAV from ½ H.P. tc 15 H.P. Speeds from 3600 to 1200 R.P.M. Equipped with vertical or horizontal feed, or both feeds. Micrometer feeds. Hollow spindle for wet grinding. For cup wheel, plate mounted cylindrical wheel, or straight grinding wheel.



"AIR-RESTER" dust collecting equipment. (Also illustrated and available separately.) For all kinds of dust, grit, etc. Three sizes.

36" Openside Shaper converted into a grinder with STANDARD TYPE PAV Vertical Spindle Grinder, telescopic wheel guard and "Air-Rester" dust collector.

WRITE FOR CATALOG 44 TODAY!

ALSO: GRINDERS—ALL KINDS! UP TO 100 H.P.
BUFFERS—POLISHERS UP TO 60 H.P.
ABRASIVE BELT MACHINERY
SPECIAL MACHINERY

The STANDARD ELECTRICAL TOOL Co.

2487 RIVER ROAD • CINCINNATI 4, OHIO

HOW A J&S "*Fluidmotion*" WHEEL DRESSER
cut production costs
FOR THE ADAMAS CARBIDE CORPORATION

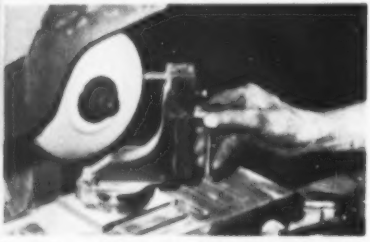
The Adamas Carbide Corporation, Harrison, N. J., reports that its standard Model "E" J & S "Fluidmotion" Wheel Dresser has



To set-up for convex radius, first mike distance from diamond point to micrometer plate, then add radius desired. (For concave radius, subtract).



Slide dresser in dust-proof channel till mike slips over pins as shown and lock with socket wrench. Dresser is now ready for action.



Bring diamond point up to center line of wheel, rotate dresser on swivel base in one continuous motion. A clean, accurate radius results!

CUT SET-UP TIME
CUT DRESSING TIME
and, for 4½ years, has
PROVIDED TROUBLE-FREE SERVICE

THE photos at left, taken at Adamas Carbide, show how a convex radius — accurate to .0001"—can be obtained in three simple steps. According to Adamas, in 10 minutes they can teach a man of average experience how to dress such a radius!

Dressing two angles tangent to a radius, only one more step is necessary. After the radius is set (steps 1 and 2 at left), the dresser is swung on its graduated base to the two angles, which are then locked in with the knurled knob. Actual dressing is accomplished in one continuous motion—it is *not* necessary to move the dresser on dovetails to form the angles.

The dresser previously used by Adamas was hard to apply, set-up, and use. And it frequently required new parts. Now, for 4½ years, the company has enjoyed the lower production costs made possible by "Fluidmotion's" unique abilities. Application to any surface or cylindrical grinder is quick, simple—set-up and dressing time are fastest available—and wear is negligible, as indicated by Adamas' 4½ years' use with never a new part required.

Adamas Carbide, well known for its high quality, low cost carbide blanks, attributes a fair share of its success to its J & S "Fluidmotion" Wheel Dresser. The chances are that "Fluidmotion" can also cut *your* production costs. For details, write

*Reg. U. S. Pat. Off.

OTHER "Machine Shop TIME SAVERS" by J & S

J & S "All-Purpose" Jaw Clamps, KOALA Circular Cutting Tool, "Down-Hold" Vise Jaws, and "Attachable" Parallels. Write for "Time Savers" Booklet.

J&S TOOL CO., INC.
475 Main Street, East Orange, N. J.
Representatives in Principal Cities

AT LAST!

A Hitch Feed For Lighter Gauge Stock!

DICKERMAN

NEW 2½" HITCH FEED



WIDER RANGE — GREATER CONTROL

Handles Stock up to .050" Thickness

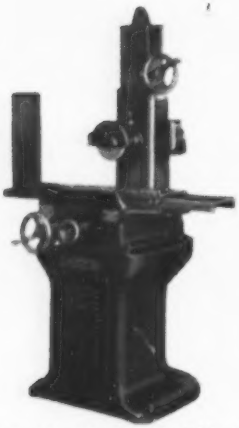
Automatically maintains the proper gripper plate angle. No tools of any kind are required to make adjustments for gripping pressure or feed length.

This Hitch Feed will handle the feeding of intricate multi-station progressive dies, as well as simple blanking and piercing dies.

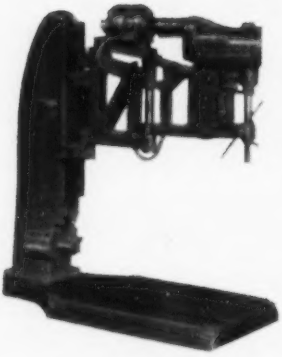
The design of the new Dickerman Hitch Feed allows it to be easily mounted on any press or to the die-set. The massive main frame and moving members and Carboloy wear and gripping plates assure users of many years of service. Write for detailed information.

H. E. DICKERMAN MFG. CO.

322-1120 ALBANY STREET **SPRINGFIELD, MASSACHUSETTS**



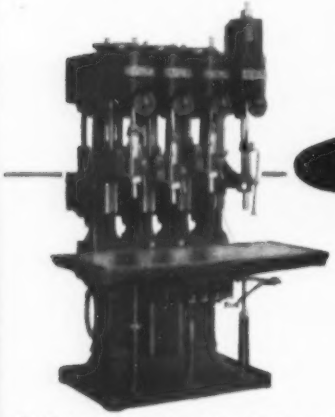
A very accurate 6" x 18" Hand Feed Surface Grinder especially adaptable for Tool Room Work and work on small, fussy pieces.



A Unique Radial Drilling Machine with Hinged Bracket that makes it possible to swing quickly from hole to hole over a wide area. A very convenient tapping arrangement is incorporated in this machine.

A TIME TESTED LINE OF MACHINE TOOLS

Engineered for Production



Built in 1, 2, 3, 4 and 6 spindle models, also as a tool room drilling machine, these sensitive drilling machines are accurate for the most exacting work and have the usual Footburt sturdiness of construction to make them suitable for continuous production line work. The above 4 spindle machine has tapping attachment and power feed attachment.

● The choice of fine machine tools is an investment for future profits when products have to be made with increased accuracy and efficiency.

These machines are built with the usual Footburt workmanship and sturdiness that will keep them accurate over a long period.

THE FOOTE-BURT COMPANY, Cleveland 8, Ohio

Detroit Office: General Motors Building

A TIME TESTED LINE OF MACHINE TOOLS

FOOTBURT

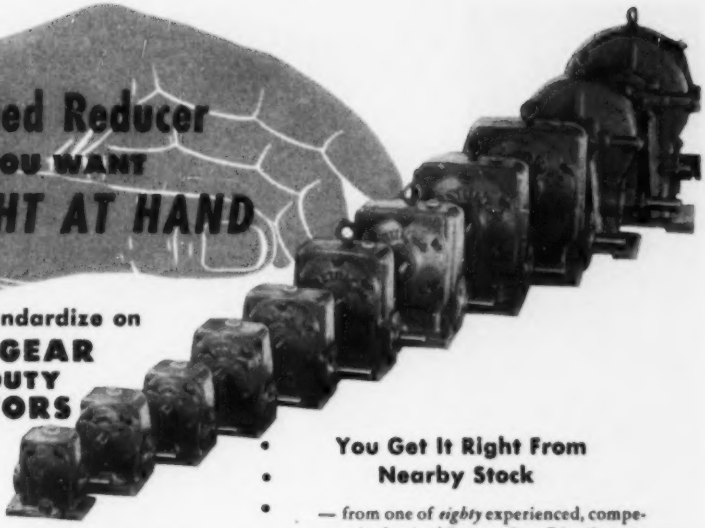
machine tools

ENGINEERED FOR PRODUCTION

The Speed Reducer YOU WANT IS RIGHT AT HAND

when you standardize on

BOSTON GEAR HEAVY DUTY REDUCTORS



You Get the One Best Unit For the Job

BOSTON GEAR HEAVY DUTY REDUCTORS OFFER YOU:

1. *The widest selection of types and sizes.* Pictured above is but one (T Series, Horizontal Right Angle Drive) of *eight* types — each in a range of sizes.
2. *More trouble-free horsepower per dollar.* Heavy gearing of BOSTON *Gear* quality — worm integral with shaft-housings of Boston Gear iron — rugged steel shafts.
3. *More trouble-free hours per dollar* — the assured result of Boston Gear design, quality of materials, workmanship and quality control.

You Get It Right From Nearby Stock

— from one of *eighty* experienced, competent Authorized Boston Gear Distributors.

Simply consult the new Boston Gear Catalog No. 55 (copy mailed on request). It contains ready reference charts for quick selection of the one best Reductor for each and every purpose.





Ten U Series BOSTON Heavy Duty Reductors provide the right angle drive and speed reduction for the tumbling barrels in this plating tank.

BOSTON Gear stocks are Near

BOSTON GEAR WORKS

48 HAYWARD ST., QUINCY 71, MASS.







3 H.P. Precision External Grinder with two Internal Spindle units which interchange with external spindle.

for Precision Grinding

Internal

External

Surface!

These HISEY Wide Range Precision Grinders can be mounted on lathes, planers, boring mills, milling machines and other machine tools for all sorts of internal, external and surface grinding operations. Rigid construction throughout insures accuracy for production as well as tool room operations.

Spindle units have dove tail slide and internal and external spindles are quickly interchanged. V-Belt drive provides correct speed for all kinds and sizes of grinding wheels.

Bases have large flat pad with bolt slots to facilitate mounting on the regular tool holding fixture of the machine tool. Constant speed motors are used throughout providing uniform wheel speed for best grinding results.

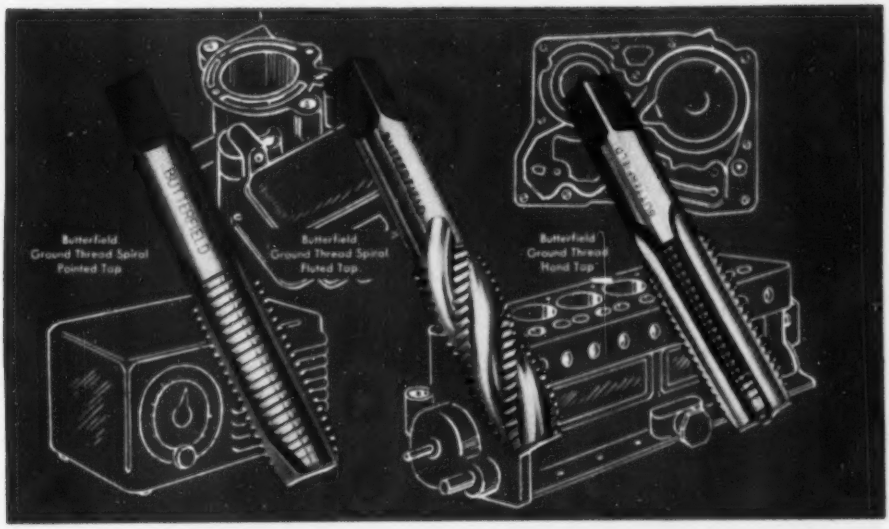
Made in sizes from 1/4 H.P. to 10 H.P. capacity

Other "HISEY" Products: Bench and Pedestal Grinders and Buffers, Snagging Grinders, Tool Post Grinders, Wet Tool Grinders, Disc Grinders and Drill Grinders.

ASK FOR COMPLETE CATALOG 71 MF.

Hisey THE HISEY-WOLF MACHINE CO.
CINCINNATI 8, OHIO
Division of The Cincinnati Electrical Tool Co.

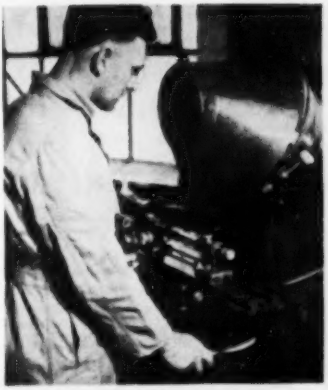
These Butterfield Taps



take to every type of material

Yes . . . whether you work with steel, cast iron, plastic, aluminum, magnesium or any other metal, you can rely on Butterfield for a clean-cut tapping job. Butterfield taps are available in designs best suited for each of these materials. Like all Butterfield tools, the taps are individually inspected. They are also ground thread assuring you maximum accuracy and savings by fewer wasted parts.

Insist on Butterfield Taps for dependable performance. ***Prompt delivery from your nearby Butterfield Distributor.*** Union Twist Drill Company, BUTTERFIELD DIVISION, Derby Line, Vermont. *In Canada:* Rock Island, Quebec.



OPERATOR HERE CHECKS thread form and lead on a Hartness Comparator — magnification 62½ diameters.

BUTTERFIELD

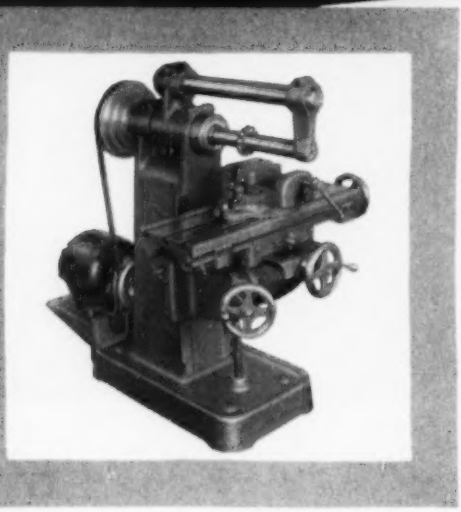
THE 100% INSPECTED TOOLS

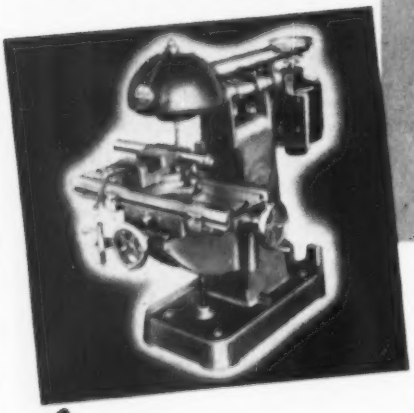
Every Tool Individually Inspected

TAPS • DIES • REAMERS • SCREW PLATES

BENCHMASTER costs less than many accessories

...Yet is a complete dual purpose milling machine in itself!





Investigate BENCHMASTER Milling Machines today!

The complete Benchmaster may be purchased for less than most large-mill accessories, yet performs as efficiently — and far more conveniently — than a large, bulky machine on all jobs within its capacity.

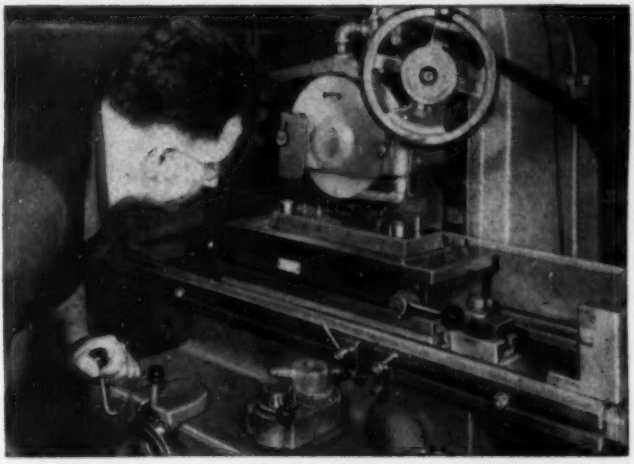
THERE'S MORE than one reason why Benchmasters win quick acceptance. Despite their low cost, Benchmasters remove a surprising amount of metal for their size. Compactness, ease and simplicity of operation get jobs *done* before setups can be made on larger mills. Interchangeable spindle quills permit both vertical and horizontal milling at one work setup. You eliminate fuss, time loss and inaccuracies of changing work position to complete your intricate milling jobs. And for accuracy, Benchmasters are on the money!

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Enthusiastic Customers do our BEST advertising



Tinnerman Products, Inc. of Cleveland, Ohio, manufacturers of Speed Nuts, use a No. 25 Grand Rapids Hydraulic Feed Surface Grinder in their toolroom. Here their Model 25 is shown grinding a combination die.

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. **One-piece column and base casting for vibrationless rigidity**
2. **Precision ball-bearing spindle which is greased for life**
3. **Bijur one-shot lubrication system eliminating hand oiling**
4. **Patented vertical movement of wheel head for quick, accurate adjustments**
5. **Portable coolant tank for ease of coolant replacement**
6. **Vane type hydraulic pump for fast longitudinal table travel**

to serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

GRAND RAPIDS GRINDERS

GALLMEYER & LIVINGSTON COMPANY

308 Straight, S. W., Grand Rapids 4, Mich.

SAVE TIME—SAVE MONEY WITH famco (COST CUTTING) machines



ARBOR PRESSES

In 32 stock plain lever, simple ratchet, combination compound and simple ratchet models, bench and floor types. Deliver up to 15 tons pressure.



POWER PRESSES

Open-back, inclinable, bench and floor type. Heavy semi-steel, cast iron frame and drop-forged, one-piece crankshafts. Most models; highest quality in small presses.



DRILL PRESSES

Best buy in 15" drill presses. Complete line of single and multiple spindle models, bench and floor types. Many exclusive Famco features.



SQUARING SHEARS

In 3 power and 5 foot models. Cutting widths 22" to 52". Capacity up to 18 gauge mild steel. Inexpensive, ruggedly built, many features.



FOOT PRESSES

In 10 bench and floor type models of sturdy, semi-steel construction, accurately machined for trouble-free operation. Deliver up to 3¾ tons pressure.



METAL CUT-OFF BAND SAWS

High quality machine tool made in both dry and wet cutting models. Capacity up to 8" round and 6" x 12" rectangular stock. Many exclusive Famco features.

Designed for time-saving jobs . . . built for long-lasting performance and maintenance economy, Famco machines have earned the reputation of being the finest quality tools for the price. They are a development of nearly a quarter century of design and manufacturing experience . . . incorporate exclusive features not found on any other make regardless of price, and many found only in more expensive lines. The complete Famco Line is available through industrial equipment distributors everywhere.

FAMCO CATALOGS GIVE FULL DETAILS

We invite you to check your needs against the Famco Line, shown above, then write for catalogs on the products in which you are interested. There is no obligation.



FAMCO MACHINE COMPANY

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They cost you less to use



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UNION *reamers, standard or special, last longer on every type of job*

Whether you're removing a lot of metal or a few thousandths, on run-of-the-mill or high precision work, Union Reamers are your best bet for the long life and accurate performance that save time and cut production costs.

Chances are your reaming jobs can all be handled by proper selections from the broad range of Union Reamers made to top-quality standards.

See your Union Distributor for all standard or special needs. If your applications are unusual, he'll arrange to get all necessary information, including sketches. Look for his name in THOMAS' REGISTER on Union's insert in the "Drills, Twist" section.



no other reamer will outperform a **UNION**

contact your local distributor

His name is listed in Union's THOMAS' REGISTER insert under "Drills, Twist."

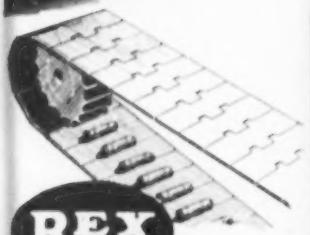
UNION TWIST DRILL COMPANY, ATHOL, MASSACHUSETTS

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We own and operate S. W. CARD MANUFACTURING CO.: Division, Mansfield, Mass. Taps, Dies, Screw Plates . . . BUTTERFIELD DIVISION, Derby Line, Vt., Taps, Dies, Screw Plates, Reamers . . . BUTTERFIELD DIVISION, Rock Island, Que., Milling Cutters, Twist Drills, Hobs, Reamers, Taps, Dies, Screw Plates.



Two type HD 2436 Hevi Duty Vertical Retort Furnaces in use at The Chain Belt Co., Milwaukee, Wis.



is heat-treated in modern
HEVI DUTY FURNACES

For dependable results that add extra quality to Rex Table Top Chain, each section is case hardened in a Hevi Duty Furnace.

It's the Reliability of HEVI DUTY FURNACES

that enables you to CUT the COSTS of case hardening parts for your product

These versatile Hevi Duty Electric Furnaces at the Chain Belt Co., of Milwaukee are in daily use carburizing, hardening, and annealing the many diversified parts used in REX Chains.

Typical of the many heat treated parts are the sections of the popular REX TABLE TOP conveyor chain. Where minimum distortion during heat treatment is a necessity and accurate case depths must be maintained, Hevi Duty Furnaces are first choice.

Send for Bulletin HD 646

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES **HEVI-DUTY** ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

PEDRICK PRODUCTION BENDERS

Need No Internal Mandrels

PRODUCTION BENDERS

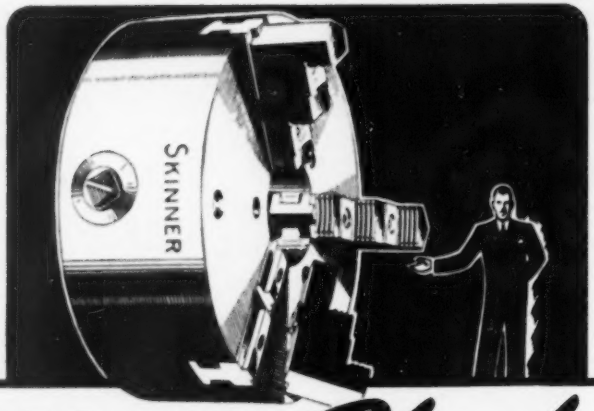


WRITE FOR OUR DESCRIPTIVE FOLDER

Contrary to the usual belief, Internal Mandrels are not needed when Compression Type Benders are used. This is so because the neutral axis is on the outer third of the section and less stock is in tension. The result is that the flattening effect on a compression bender is only one half that of other types. No skill is needed to run a machine without a mandrel. The cheapest labor can be used which saves money for the job. Since labor is about half the bending cost, (the other half being your overhead), the use of Minimum Cost Labor cuts your bending cost in half.

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SERIES 3900
SELF-CENTERING
SCROLL CHUCK

SKINNER 3-JAW SCROLL *Chucks*

LARGE in VALUE..

LONG in LIFE...

BIG in QUALITY...

LARGE IN VALUE . . . because Skinner 3-Jaw Self-Centering Scroll Chucks are made with the most modern machines and by the most modern methods — there is more for your money in Skinner Chucks because accuracy is built in to last.

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BIG IN QUALITY . . . because, for 61 years, Skinner has provided chucks to meet the latest machine tool requirements. Skinner quality starts with modern design and makes itself evident in every step of construction. There are no better chucks made.

Write for your free copy of Catalog No. 61.

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HAND & POWER OPERATED MACHINE CHUCKS—AIR CHUCK EQUIPMENT
—FACE PLATE JAWS—MACHINE VISES

SUPER SAFE!



HIGHLY RESISTANT TO RUPTURE

ROUGH SIDES FOR COOL SIDE-CUTTING

NYLON REINFORCED FOR EXTRA STRENGTH

SAF-T-CUT Cut-off Wheels

(six inch thru twenty inch diameters)

Bay State Saf-T-Cut wheels are strong, tough products manufactured in such a manner as to permit high speed operation and to withstand abuse of rough usage on heavy duty jobs. They resist common breakage from the twisting torque or lateral pressure that frequently occurs. They can be used WET or DRY.

In addition to their use on cut-off machines, the smaller diameter Saf-T-Cut wheels 6", 7" and 8" are ideally suited for use on straight portable grinders for slotting and notching operations.

Ask for a demonstration.

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Unsurpassed for cutting off sprues, gates and risers from non-ferrous, stainless steel, monel and cast iron castings . . . slotting track welds . . . cutting transite, fire brick, etc.

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MEMBER OF THE GRINDING WHEEL INSTITUTE

Top Performance Consistently Duplicated

The Practical Solution to Your Small Bearing Problems . . .



NORMA-HOFFMANN Small BEARINGS . . .

Wherever your designs call for *small* bearings, that's the time to *specify* and *use* Norma-Hoffmann Small Bearings. For like all Norma-Hoffmann bearings, these small precision bearings are engineered to give efficient, trouble-free service for years on end. They are extra quiet in operation . . . require little if any maintenance . . . improve the performance of the product.

Write for catalog describing these *small* bearings as well as other Norma-Hoffmann Bearings. They are available in a wide range of types and sizes from $\frac{1}{8}$" to 22$\frac{1}{2}$" bore . . . a type and size to meet every speed, load and duty.

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"no more GAMBLING on tool steel selection"

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"*Handiest selector I've ever seen*"
"*No more gambling on tool steel selection*"
"*You're right, the application should dictate the choice of the tool steel*" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.



Selector diameter 9", in 3 colors

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Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

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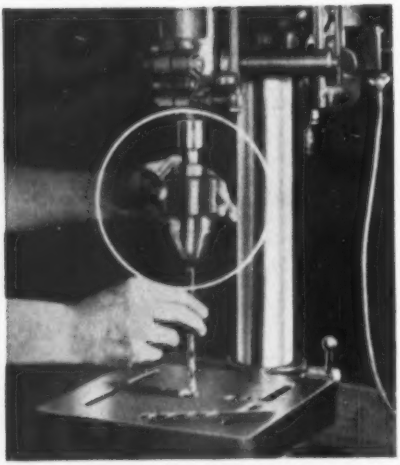
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fifty years of Fine *steelmaking*

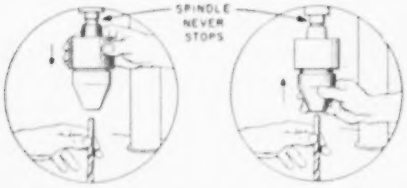
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Change drills in a second, safely with this Automatic Chuck while spindle is running



AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down—jaws open automatically—drill is released.

2. Insert new drill—push up tapered part—drill is locked in place.

You don't stop the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. *One spindle does the work of several.*

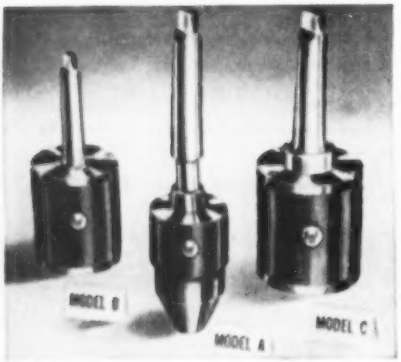
Tools last longer, too...smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools...Model A—1/32" to 1/2"; Model AA—1/64" to 3/8"

See your local distributor or write today for Bulletin 56-1.

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.
5502 SECOND AVENUE BROOKLYN 20, N. Y.

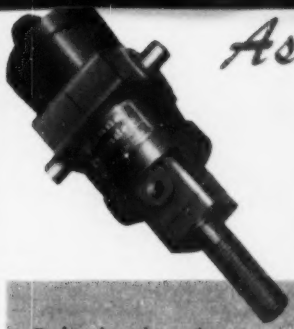
THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges
Model A—1/32" to 1/2". Model AA—1/64" to 3/8".
Model B—15/64" to 1/2"; 3/8" to 3/4"; 17/32" to 1".
Model C—Holds any size tool with No. 1, 2, or 3 M.T. Shank.

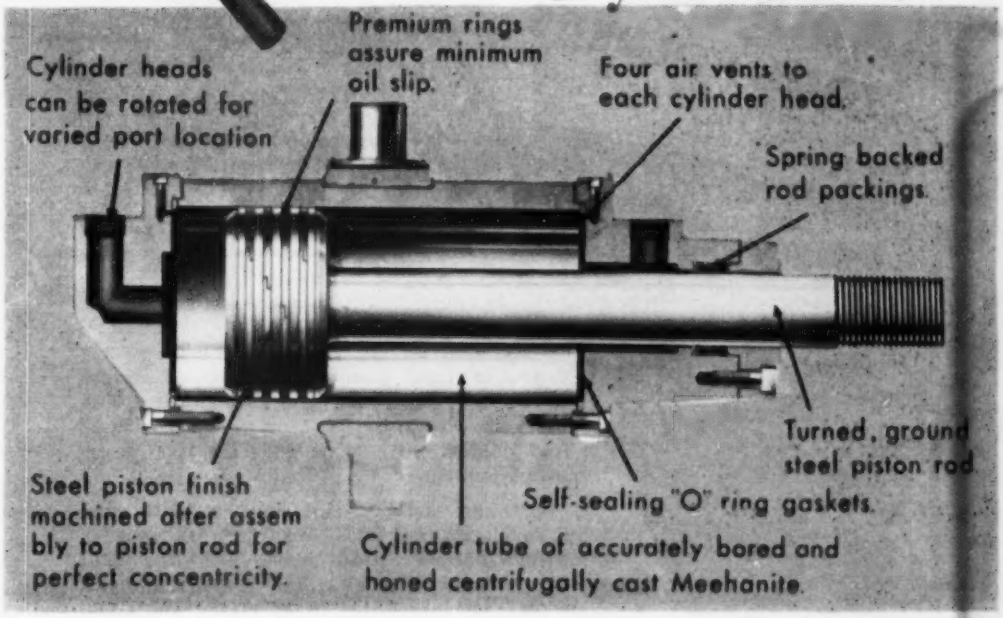
WAHLSTROM
fully automatic
DRILL CHUCKS
NO KEYS, COLLETS OR WRENCHES

amf



As always DESIGNED AND BUILT FOR *FINEST* PERFORMANCE

Hanna H P HYDRAULIC Cylinders



for 50 years the Hanna nameplate has signified the finest engineered products. Meeting JIC Hydraulic Standards is nothing new for Hanna High Pressure Hydraulic Cylinders. They have always been designed, engineered and built to assure top-quality and dependable performance.

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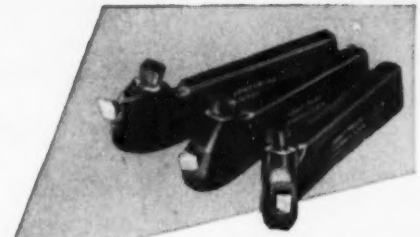
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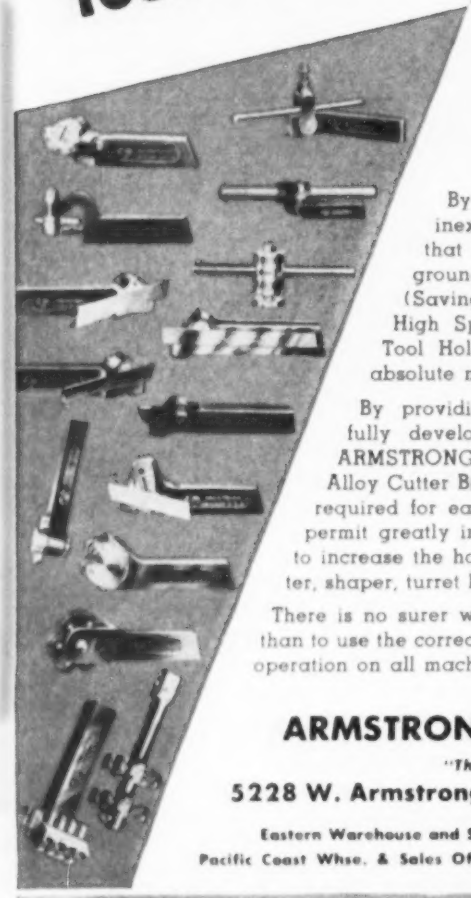
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MODERN
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NOVEMBER, 1950 • Vol. 23, No. 6

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JET ENGINE OVERHAUL



Line at Tinker Air Force Base in Okahoma City includes facilities for complete overhaul of jet engines

By Bartlett West

FROM the standpoint of its operation, a jet engine is considered a simple power plant. However, when it comes to overhaul the men at Oklahoma City Air Materiel Area will assure you that it is more of a problem than the complicated-looking reciprocating engine.

The jet engine overhaul line at Tinker Air Force Base in Oklahoma City is the largest one in existence, and has been in operation just three years. At the beginning of 1947 Tinker AFB was selected by the Air Force for the job of overhauling jet power plants, and the scant handful of equipment available for this work was transferred from the San Bernardino Air Materiel Area. Four months later the line was ready for operation. In May 1947, during its first month of operation, Tinker AFB overhauled 12 jet engines. Today it overhauls an average of 350 engines a month without even going into high gear. Just what the line would be capable of doing if pressed to its limits in an emergency the Air Force prefers not to say.

Jet engines from USAF aircraft all over the world are gathered up by Air Materiel Command's Supply Division and delivered to Tinker Air Force Base. There Maintenance Division takes over the job of sending the service-wearing engines on their orderly procession through the air-conditioned overhaul shops.

At its first stop, the engine is stripped of all accessories, and right there the jet gives the lie to its reputation for simplicity. Accessories for a reciprocating engine consist of a fuel injection pump, a magneto, a master control, spark plugs, and a spark plug harness. Some types of jet have as many as 109 items classed as accessories. As each item is removed, it is fitted with an instruction tag

The variety of accessories shown on the bench in the foreground should make it pretty clear that the J-35 shown here is anything but a simple engine. Removal of accessories is the first step in the jet engine overhaul work being conducted at Tinker Air Force Base, Oklahoma City. "Reparable" tags, attached at this point, remain with the accessory until it goes back on the engine at the reassembly point.





It requires accurate timing and attention to temperature to separate the stages of a jet engine's compressor rotor. Dry ice packed into the core of the rotor contracts it, while the acetylene torch heats the various compressor stages. At the precise moment when the stage expands away from the core it is lifted off by the jack-operated hoist.

which stays put through all soakings, repairs and testings and is not removed until the accessory is again back in place during reassembly.

Down the line a short distance the engine is separated into its component parts. A jet engine is as tempermental as a prima donna. Because of this individuality, component parts are never interchanged. Each part goes back into the engine from which it came, and when replacement is necessary the new component must be adjusted to fit the praticular engine in which it is installed. Reciprocating engines present no such problem. Most parts from one engine will work as well in any other engine, and may see service in a half dozen engines before they outlive their usefulness.

Ferrous and non-ferrous jet engine components require separate cleaning processes. Then each component is checked for cracks or flaws. A special penetrating fluorescent fluid seeps into the tiniest crack in ferrous material and the flaw is revealed under the eagle eye of a Magnaflux. Non-ferrous materials are subjected to a similar inspection under the black light of a Zyglo, while internal porosity is exposed by a deep-seeing Sperry Reflectoscope.

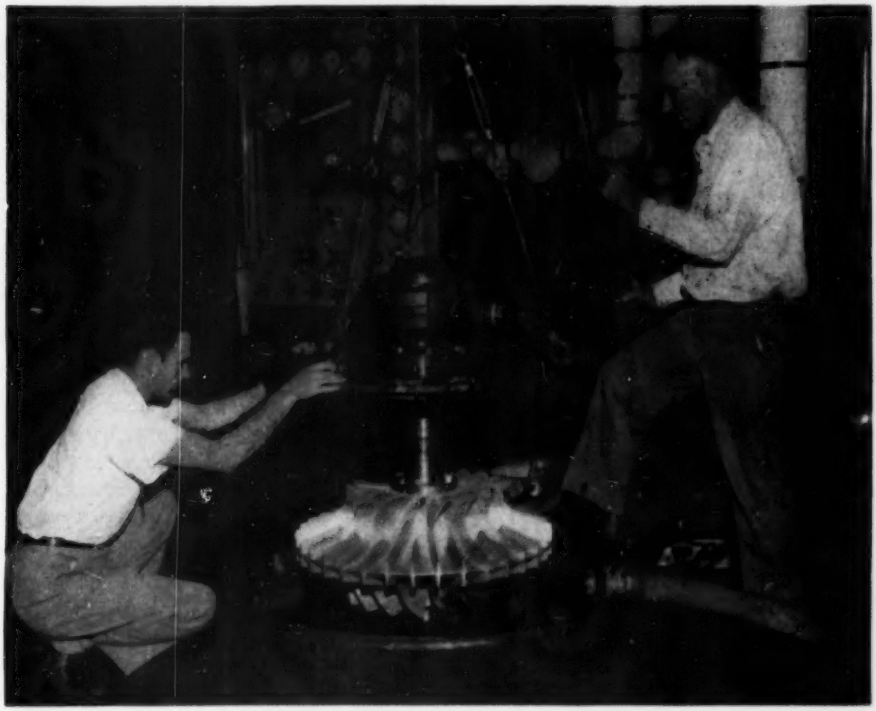
Rotors which survive the overhaul line at Tinker AFB can take any punishment they will ever get in actual

use. Before they are OK'd for re-assembly they must prove themselves in a high speed spin pit. Here the J-33s are spun at 15,000 r.p.m.; J-47s at 9,100 r.p.m.; and J-35s at 8,800 r.p.m. Occasionally the strain proves too great, and a rotor flies apart during the test, but the 21 layers of armor plate with which the spin pit is lined keep the dangerous flying bits of metal safely confined.

Once re-assembled the complete engine undergoes its final checking in the engine test cell. During the 45-minute run, checks are made of ambient air, compresssor, and tailpipe temperatures, a record is made of the specific fuel consumption at various r.p.m. settings, and the engine is checked for indicated thrust. The readings are then converted to sea level conditions to determine actual thrust being delivered.

A corrosion preventive oil is run through the engine and the turbine wheel is given another Zyglo check to make sure no defects have developed during the test run. When the engine has finally been given the nod by the Tinker Air Force Base Maintenance Division, it is sealed and packaged and returned to Supply Division for redistribution as needed.

From the time it enters the overhaul line until it is sent out again for use, each jet engine receives from 300



This J-35 compressor rotor has passed the spin pit test at 15,000 r.p.m. and is now ready to go back into active duty. Sometimes the spin test proves too much of a strain and rotors are picked out of the armor plated pit in pieces.

to 400 man-hours of expert attention from specialists. Much of this time is devoted to testing to ensure the better-than-new condition which is the standard set up by those in charge of the Tinker AFB jet overhaul line. For example, it requires 14 man-hours to overhaul a gas turbine fuel control—and another five hours to complete tests on it.

The overhauled jet power plant that has earned the Tinker seal of approval is not an "old" engine. Performance standards required of it are higher than those it was required to meet when it originally left the factory. Proof that the overhauled engines give an excellent account of themselves after they have undergone the Tinker treatment is borne out by Maintenance Division records. The first jet engine ever to come off the Tinker line—a J-33-11 series—was first sent back into service on May 27, 1947. After 174 hours of flight time it was returned to Tinker Air Force Base on July 9, 1949, for its second overhauling. Today that same engine is again in active use.



"Gee!—ya learn something new every day!"

Although the Tinker Air Force Base jet overhaul line is now a big scale operation, it took a bit of work to get it to its present stage. Much of the equipment now used in the overhaul of jet engines was originally designed for reciprocating engines, and extensive redesign and adaptation was necessary to fit it for jet engine work.

For instance, there's the giant S-shaped parts washer at the very beginning of the disassembly line. It was brand new, and surplus, when the installation at Miami, Florida was closed, but it had been designed for cleaning parts from reciprocating engines. Adaptation included lowering the overhead monorail, widening the tanks, increasing the soak areas, and changing internal temperatures.

Elevators in the test cell blocks where overhauled engines are put through their final paces are another innovation. The lifting power of the elevators was adequate for the slightly heavier weight of the jet engines, but the floor openings were too small to allow the tailpipes to pass through. The problem was overcome by installing a section of steel floor which slides down one wall into the basement of the cell block as the elevator rises. Now the elevators have plenty of clearance for the longest jet engines.

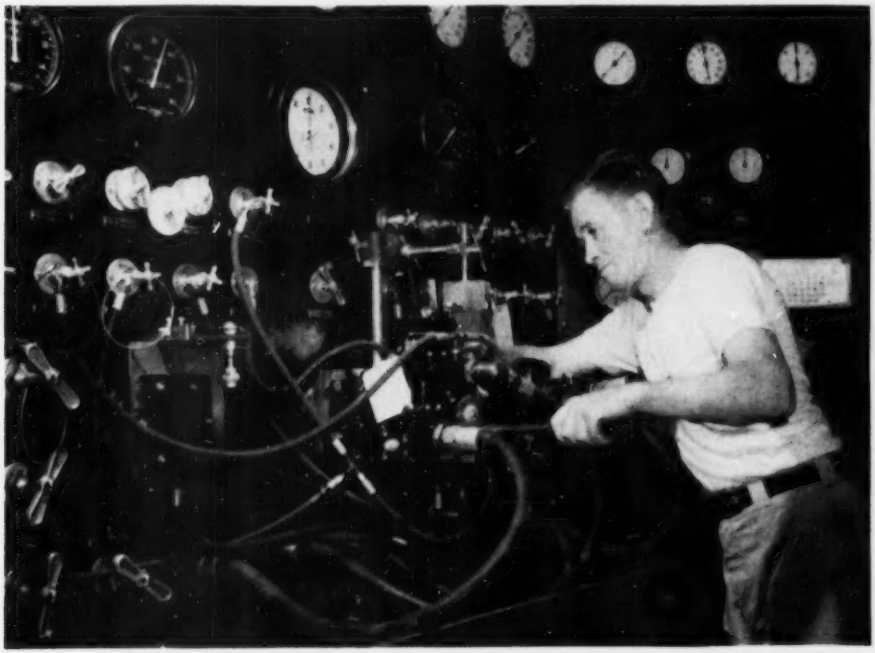
Another problem peculiar to jets is their noise. Baffle plates at intake and exhaust ends of the concrete test cell blocks keep the noise from reciprocating engines within bearable limits, but they don't do much for jets. A little muffling has been achieved by

the installation of large steel stacks which extend up through the roof of the jet test cells. This arrangement dissipates some of the ground vibration and fumes during testing operations. Engineers at Tinker Air Force Base are now working on a labyrinth type exhaust stack which will have its interior area fitted with overlapping shelves. They hope that by the time the roar of a jet has beat its way out of this maze it will be weakened to a comparative whisper.

When that problem has been solved there'll be the problem of jets with after-burners. Constant improvements on jet engines keep the Tinker line from becoming static, and the men in charge of the work are in no danger of resting on their laurels. Keeping those "flaming stovepipes" in tip-top flying condition is a real challenge—and something of a headache.

Is it worth it? A brand new turbojet J-47 costs $45,000.00. Overhauling it costs $2,099.95. From the standpoint of the American taxpayer that's a real bargain. Is the overhauled jet really as good as a new one? Ask the man who flies it. From his standpoint the work being done at Tinker Air Force Base is pretty close to a miracle.

(Illustrations furnished courtesy USAF Air Materiel Command)



The gas turbine control being fitted to this test panel has just undergone 14 man-hours of overhaul. It will have to survive another five hours of testing before it is approved for re-use.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

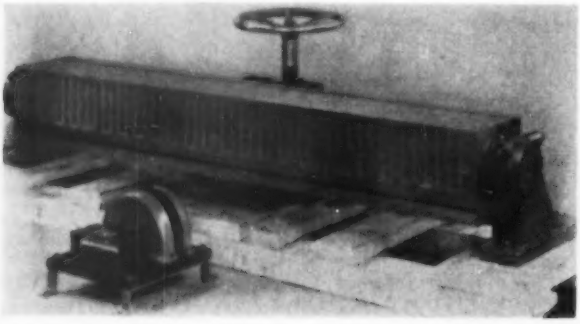
Holding Work Magnetically, Part II

The author continues his discussion of magnetic holding devices, including swivel-type magnetic chucks, rotary magnetic chucks, magnetic sine tables, magnetic V-blocks, and special auxiliary magnetic equipment.

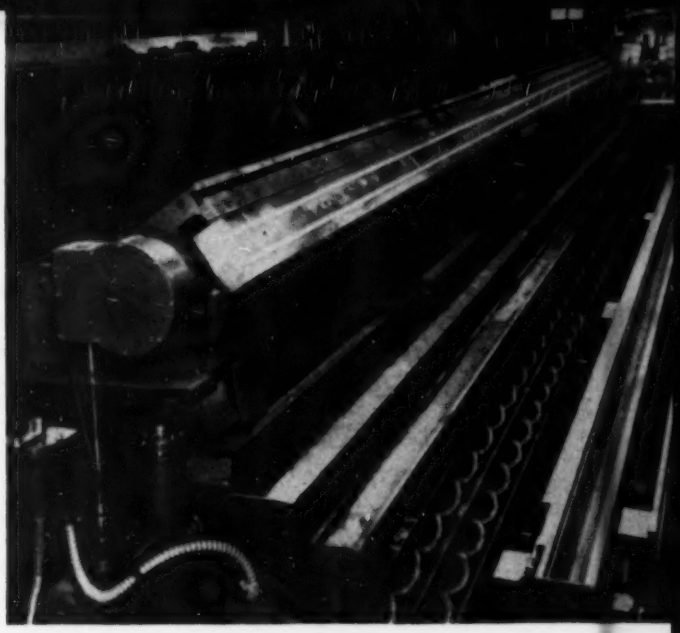
By John E. Hyler

SWIVEL-TYPE magnetic chucks mentioned in connection with toolroom practice in Part 1 of this series are by no means limited to toolroom practice, although it is obvious they are not needed quite so extensively in production. Grinding of bevels in production work is often accomplished on swivel-type magnetic chucks mounted on trunnions in such manner that they can be adjusted to the desired angle and locked firmly in that position. It is obvious that swivel-type chucks may be employed for plain parallel surface grinding when required. They are particularly useful, for instance, in surface grinding such items as long machine knives, shear blades, brake dies, and so on, and for later grinding any necessary bevel or bevels on one of the edges of such parts.

In addition to models used in toolroom practice, special knife-bar swivel chucks are available. Swivelling magnetic chucks are generally square or approximately square in cross section. One line of such chucks includes models available in cross sections of 5 x 5, 6 x 6, 8 x 8, 10 x 10 and 12 x 12 inches, with a choice of four or more



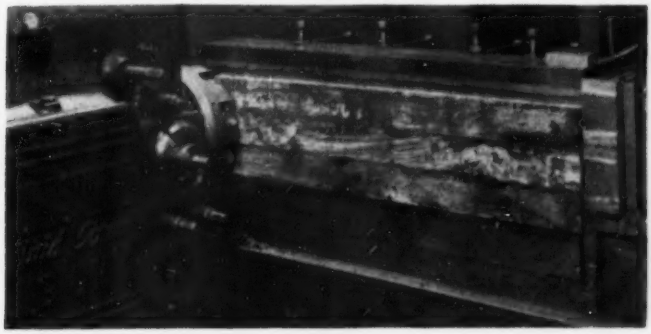
This is a view of a swivelling chuck of the type often employed in the knife grinding industry. It has two adjacent magnetic faces and the apex or corner between them is also magnetic. Such magnetic chucks are eminently practical for grinding narrow strips of any kind. A central control is provided for swivelling the chuck, which is operated by the handwheel shown, and this insures uniform movement of the chuck on its trunnions. Illustration, courtesy of O. S. Walker Company.



The long grinding machine shown here is provided with four swivel-type magnetic chucks, mounted on trunnions end to end, and used for grinding angular surfaces on shear blades up to 260 in. in length. The arrangement is such that the magnetic poles are continuous for the full 260 inches, even though four mounting castings are employed and supported on separate trunnions. On long work of this kind, if the pieces are not exactly straight, a powerful, penetrating magnetic circuit allows steel shims to be used where required. Illustration courtesy of Sundstrand Machine Tool Company.

lengths in each cross section. Again, there is a line of swivelling chucks having two adjacent faces magnetic, including the apex or corner between those faces. This construction makes it possible to hold and accurately grind very narrow strips which are otherwise a problem. In addition, such chucks readily meet requirements of the knife grinding industry. In many of the swivel-type chucks, the swivelling action is effected through a handwheel shaft on which is mounted a worm engaging a wormwheel mounted concentric with the axis of the swivelling chuck. This arrangement provides a means for easy and high-accuracy adjustment.

There is an occasional need for a double face magnetic chuck of **rigid** type where narrow strips are to be ground either parallel or at some **standard** departure from parallelism. Such chucks are available and in use. Naturally, in out-of-the-ordinary instances where very narrow strips are to be held for other operations, as for instance milling, these chucks perform equally as well. Milling operations of



In this illustration, a special magnetic fixture is seen holding three cam bars for face milling at one pass. This operation requires milling of all four sides and both ends of each bar, making six operations. The parts are held parallel within 0.001 in. to 0.003 in. in the milling operations, and subsequent rough surface grind is eliminated. Illustration courtesy Sundstrand Machine Tool Company.



A face grinding operation is shown in progress with the aid of a rotary permanent-magnet chuck. The piece is held on the chuck face magnetically while the periphery of the grinding wheel is brought into contact with the surface to be ground. Illustration courtesy of Brown & Sharpe Mfg. Company.

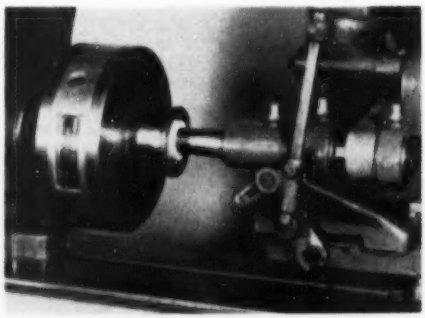
many kinds are expedited by magnetic holding. Suitable magnetic chucks are applied to vertical milling machines, the chucks being so constructed as to allow for free use of coolant.

Horizontal Milling Operations

Properly-selected magnetic chucks greatly simplify set-up operations for horizontal milling. While it is true that some magnetic chucks have left something to be desired in horizontal milling because magnetic force struck through the workpiece to establish a strong magnetic field well above the chuck, thereby causing all chips to cling to the work tenaciously, it is also true that magnetic-chuck engineers have found means for adequately controlling the magnetic field above the chuck to the point where chips are cleanly washed away by the coolant.

Magnetic chucks with contoured top surfaces or chucks using contoured top plates are often employed where there are relatively large lots of work which must be supported from a contoured surface for grinding or other operations. A very interesting case in point is a setup where ten magnetic chucks were mounted and spaced on a revolving grinder table to accommodate electric iron sole plates for finish grinding. The ten chucks were provided with properly-contoured tops to support and hold the cast parts properly, and with this setup, 600 sole plates were finish ground per hour. Another instance of such work is the use of segmental chucks for machining certain types of parts. Another application involves a magnetic chuck having an auxiliary plate with its top surface contoured in such a manner as to make it suitable for holding steel propeller blades for planing and milling operations.

It is also possible to apply auxiliary top plates or blocks to horizontal-face chucks in such a manner as to rotate the magnetic flux. Thus, in some instances, a heavy type of plate or block can be used on a horizontal-face chuck in such a manner as to present a ver-



Showing how a permanent-magnet rotary chuck can be employed for internal grinding, the work being first made to run concentrically. Magnetic flux for holding is applied simply by turning a T-handle wrench. Brushes, switches and auxiliary current supply are not required for such chucks. Illustration courtesy of Brown & Sharpe Mfg. Company.

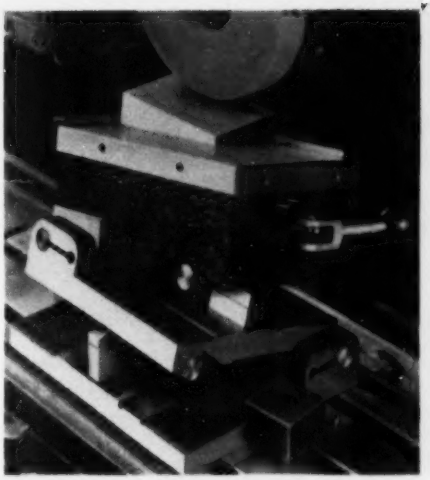
tical magnetic face, the auxiliary device being so made as to rotate the magnetic flux through 90 degrees. Special holding problems as related to horizontal-face chucks of adequate power thus involve provision of contours that will fit the irregular shapes of parts to be held and also a proper distribution of the available magnetic flux so that workpieces will be effectively polarized for most efficient holding. Such holding problems therefore require understanding of more than the bare mechanics involved for solution, and may be adequately solved only by magnetic engineers.

Recesses and Bores Hold Parts

In some instances, instead of contouring the surface of a magnetic chuck, it may be recessed in one way or another. Rotary magnetic chucks have been fitted to lathes, for instance, and have been provided with machined recesses so that odd-shaped parts could be held in a particular position for machining. Again, a large magnetic rotary chuck has been provided with a hole circle consisting of ten bored holes to receive the hubs of gears for grinding them flat on the opposite side.



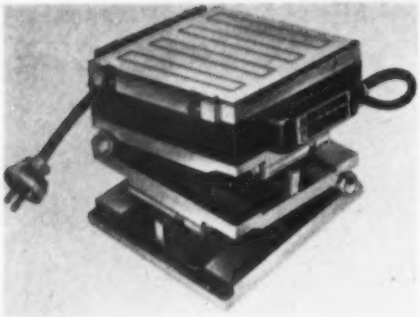
Both rotary and rectangular models of permanent-magnet chucks are suitable for relatively light machining operations. Here a light cut is shown being taken while the workpiece is held by a rotary-model chuck of permanent-magnet type on a lathe. Illustration courtesy of Brown & Sharpe Mfg. Company.



Magnetic sine table, known to the trade as the Magna-Sine, is here shown engaged in grinding a compound-angular surface. Magnetic sine tables are also made in models for grinding single angles only. Illustration courtesy of Omer E. Robbins Company.

Rotary magnetic chucks of both permanent-magnet and electromagnetic types have made a place for themselves in many machine shops. Various boring mill jobs are handled where workpieces are held on a rotary chuck. Large bearing race fixtures have been held on a special 4-pole 24-inch rotary chuck for both internal and external grinding. On some rotary chucks of the permanent-magnet type, it is possible to sensitively control the holding power exercised on a part by giving the chuck-operating handle a **part** turn, allowing the workpiece to be moved or delicately tapped into position for accurate centering, as, for instance, where such a chuck is being used as a lathe faceplate.

Permanent-magnet rotary chucks are principally employed for relatively light cuts; however, very powerful



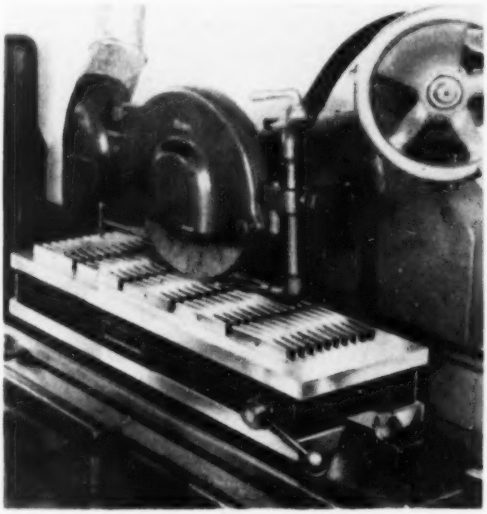
Recently-developed sine-angle magnetic chuck of electromagnetic type, for use in setups involving compound angles. Illustration courtesy of Taft-Peirce Mfg. Company.

electromagnetic rotary chucks may be used on lathes, universal grinders, chucking grinders, and so on, for various purposes.

Advantages of Permanent-Magnet Units

There are certain types of magnetic holding operations for which permanent-magnet chucks are completely adequate. Where this is the case, it cannot be denied they have certain advantages. Easy adjustability of parts for centering is one. There are no wires involved, no heating problems, and no operating costs. Since no wiring is involved, such chucks may be readily transferred to different machines as desired or to a bench. Since no current is required for operation, workpieces will not be released if and when power interruptions occur. These chucks are suitable for both wet and dry grinding operations. While they are chiefly used where very great holding power is not required, they also may be applied in out-of-the-ordinary jobs in various cases. One such instance observed was where a number of permanent-magnet chucks were used on a single automatic polishing machine designed and built for polishing toaster grill covers.

It is understood that magnetic workholding devices are limited to holding ferrous metals. Undoubtedly many have wished they would hold other materials, and probably the idea has often been expressed to magnetic chuck manufacturers. In any event, one leading manufacturer of magnetic chucks has also developed a vacuum chuck which will hold brass, bronze or other non-ferrous materials in much the same manner mechanically as ferrous



Many different types of small parts can be held for grinding on large chucks of permanent-magnet type such as the one shown here. The magnetic flux for holding is supplied by a simple 180-degree rotation of the handle. Illustration courtesy of Brown & Sharpe Mfg. Company.

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Very large workpieces may be satisfactorily held and ground on large rectangular permanent-magnet chucks. The chuck shown in this illustration has a working surface 12¼-in. long. The actual magnetic surface is somewhat smaller. Illustration courtesy of Brown & Sharpe Mfg. Company.

materials are held by means of a magnetic chuck.

It is sometimes advisable to have a magnetic chuck provided with facilities for raising one end higher than the other, especially where tapered cuts are to be made in the work length or taper-grinding is to be performed. Such chucks are readily available. Moreover, magnetic chucks referred to as duplex-base chucks are available which provide means for swivelling the chuck or revolving it on its axis and also for elevating one end above the other. It is obvious that compound angle work can be performed with these chucks. One such chuck can be swiveled to 90 degrees either side of horizontal-face position laterally, and can be end-tilted to a maximum angle of 14 degrees. This type of chuck is a time-saver in grinding or machining formed tools or in dressing either steel or carbide-tipped tools. Provision is made for rigid clamping of the chuck at any required setting.

Magnetic Sine Tables

Developments in devices for the magnetic holding of work for angular grinding and other angular operations are continuing to be made. One enterprising manufacturer has provided a permanent - magnet chuck arranged as one element of a sine table. Thus, a magnetic sine table is made available which can be set with a high degree of accuracy for grinding, honing, lapping, machining and inspecting flat surfaces, holes, bevels or chamfers which must maintain some definite and exact relationship to the base surface. This type of sine table is built in some models which are designed for holding work at single angles only and in other models that will hold work at both single and compound angles. Al-



A high-powered rotary electromagnetic chuck, shown set up for the grinding of segments. Illustration courtesy of the Taft-Peirce Mfg. Company.



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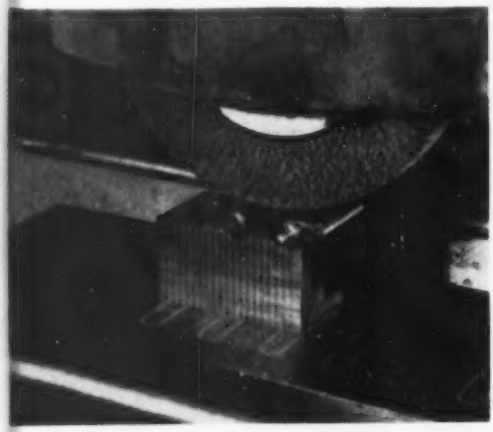
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though primarily employed in small sizes, the table is also available in sizes suitable for use on production-type surface grinders with long tables and traverse. Either wet or dry grinding can be performed to advantage with these magnetic sine tables.

There are other magnetic chucks designed for tapering operations or angular elevation. One line of such chucks includes models in lengths up to 48 inches. We have noticed another magnet chuck of this type which has a face size of 30 x 60 inches. This chuck was especially designed for use on planers, boring mills and radial drills. However, where there are **standard** parts to be machined or ground at some specific angle lengthwise (assuming that such parts are relatively small and are to be machined in large lots) it may be advisable to simply use a laminated angular block on a plain rectangular chuck, the angular block having been made to include the proper angle for the job at hand. Such a block, when placed upon a powerful rectangular magnetic chuck, will raise the holding power of the chuck to the inclined surface of the block in order to hold the workpieces.

Among the auxiliaries used in connection with horizontal-face magnetic chucks are special parallels which are laminated by alternating strips of magnetic metal with strips of non-magnetic material. The magnetic flux is conducted from the chuck through the parallels and the workpieces, thus holding the workpieces firmly. Work-



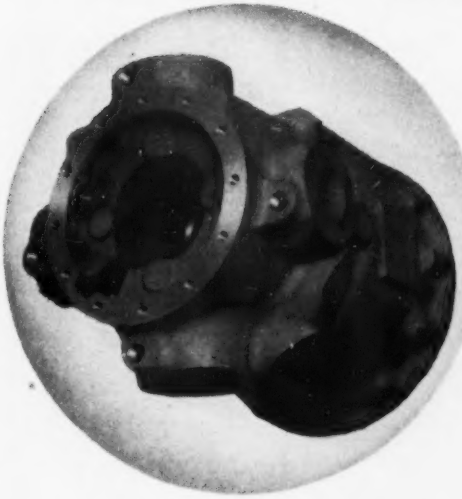
One of the most convenient accessories for the magnetic chuck is the parallel. Often these are used in pairs, so that some projecting portion of metal parts being ground or machined may be dropped down between them. But they are also used singly, as shown here. The workpieces shown are tongues for universal bevels, and a large number of them have been bolted together as shown preparatory to surface grinding their edges. With the parallel set down atop the magnetic chuck surface as shown, the holding power of the chuck is raised into the body of the parallel, and through it into the workpieces, allowing a good job of grinding to be readily obtained. Illustration courtesy of Brown & Sharpe Mfg. Company.

pieces with projecting surfaces and other irregularities which cannot be held readily on a magnetic chuck surface may be held on such parallels. They are universally applicable, are effective on any style or make of rectangular chuck, and have long been used as special tools both by toolmakers and grinding machine operators in general. Some manufacturers make the parallels available in many different sizes.

Magnetic V-Blocks

Magnetic V-blocks have been mentioned as inspection devices; however, they help solve many other work-holding problems that would otherwise be very difficult of solution. There are two different types of magnetic V-

One a minute-

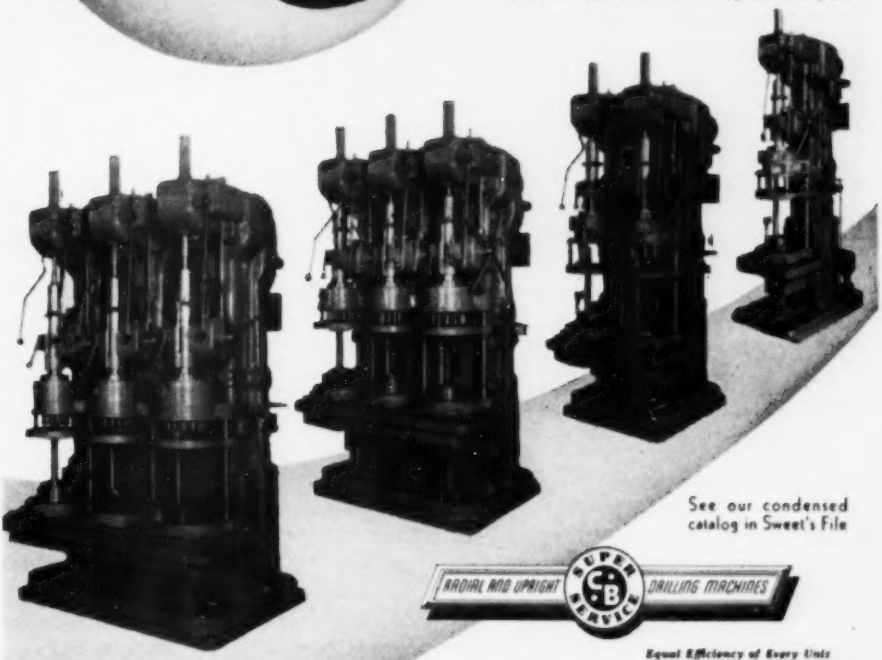


This battery of highly productive 21" and 24" Cincinnati Bickford Super Service Direct Drive Drills is drilling 24—.257" holes; tapping 24—$\frac{1}{4}$" holes; step drilling 4—$\frac{11}{16}$" x $\frac{1}{4}$" diameter holes $1\frac{5}{8}$" deep; tapping 4—$\frac{5}{8}$" holes in this crank case housing.

The operations are performed on both ends of three sizes of castings. All operations are completed at the rate of one a minute.

These Direct Drive Drilling Machines are made in the following sizes: 21" with 3 or 4 horsepower motor; 24" with 5 or $7\frac{1}{2}$ horsepower motor; 28" with $7\frac{1}{2}$ or 10 horsepower motor.

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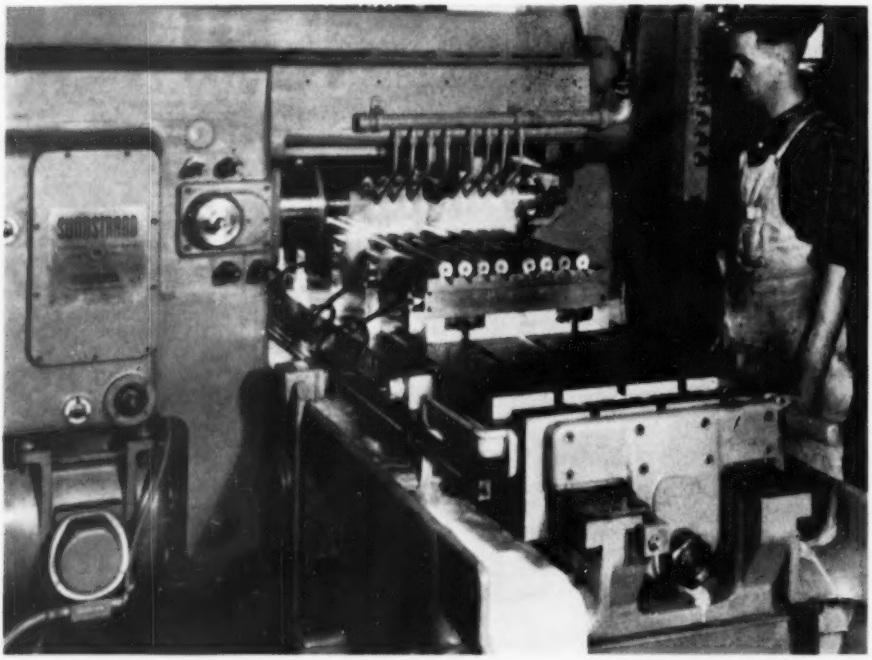
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blocks. One is the laminated type which is specifically provided for use on a magnetic chuck and will hold cylindrical parts or other items ordinarily held in a V-block, the block carbon steel laminations.

The other type of V-block is of permanent-magnet design and therefore has its holding power independent of any electromagnetic chuck. Placed on



This illustration shows eight shafts held in parallelism and at common height, a magnetic chuck layout being used for the purpose. Four keyways 5 in. x $\frac{5}{8}$ in. x $\frac{7}{16}$ in. deep are milled in each shaft. The shaft is $1\frac{5}{8}$ in. diameter with $1\frac{1}{2}$ in. diameter ends. Cutters are staggered-tooth high speed steel side mills, 6 in. in diameter. The feed rate is 5 in. per minute and rapid traverse is 300 in. per minute. Shaft diameters down to 11/16 in. are milled in the same fixture. A single fixture can be made adaptable to a wide range of shafts with one or more diameters. Production economy results whether large quantities of a single shaft are being milled, or whether moderate-sized runs on shafts of several different sizes are to be handled. Illustration courtesy of Sundstrand Machine Tool Company.

transmitting the holding power of the chuck up into its own body for the purpose. Some manufacturers use alternated laminations of brass and soft iron for these blocks, the iron being of high magnetic permeability. Other manufacturers employ non-magnetic laminations only 1/32-inch thick that are spaced in between $\frac{1}{8}$-inch thick

the surface of a metal machine table, the V-block will remain in position and will also hold a workpiece solidly in the vee. The same V-block can be set on a metal machine table vee side down, whereupon its upper surface becomes a small-area permanent-magnet chuck. This type of V-block is used considerably in manufacturing and

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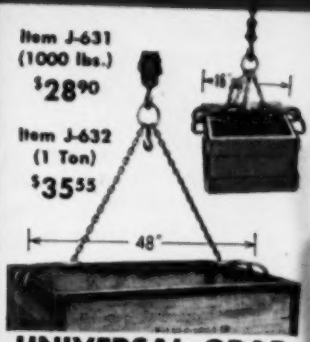
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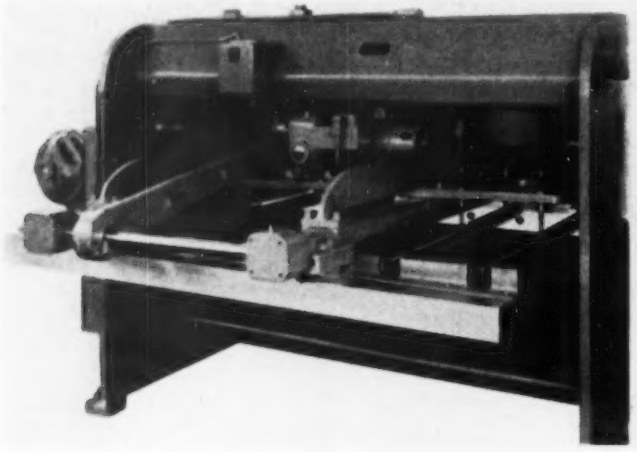
can be employed to advantage for various types of grinding jobs, both wet and dry.

Small magnetic blocks of the permanent-magnet type can be used for manufacturing processes involving small parts, as well as for both wet and dry grinding. Some of these blocks have a working surface $2\frac{1}{2}$-inches wide x $5\frac{1}{4}$-inches long and a control at one end. The end of the block opposite the control is ground square with the working surface and has a magnetic pull on it also. Therefore, the block may be set on end on any conductive surface and used in that position if desired.

Special Applications

There are out-of-the-ordinary applications of magnetic holding for which some special arrangement may be made. Occasionally, for instance, some standard job that would ordinarily be done with the help of magnetic parallels may be done with a longitudinally-slotted chuck instead. A slot of required dimension can be provided straight down the center of a rectangular chuck face for such work where large quantities of workpieces are involved.

There are also cases in which special auxiliary top plates have been designed for use with powerful electromagnetic chucks in holding a number of pieces of work uniformly spaced and in parallelism for multiple machining. An instance in point is a top plate so designed that it will hold six shear blades at a specific angle and at equal height for grinding bevels on their edges simultaneously. Another case involves eight pieces of shafting which are held in parallelism and at equal height for milling properly-centered keyways in all of them at the same time.



This illustration shows a recent development in magnetic holding devices. It is a magnetic sheet support for use with shearing machines. Illustration courtesy Cincinnati Shaper Company.

A recent development in magnetic holding devices is a magnetic sheet support designed for use with shearing machines. The purpose of this device is to support the sheet to be sheared so that it can be pushed against the back gage angle for accurate gaging. The support is built with permanent mag-

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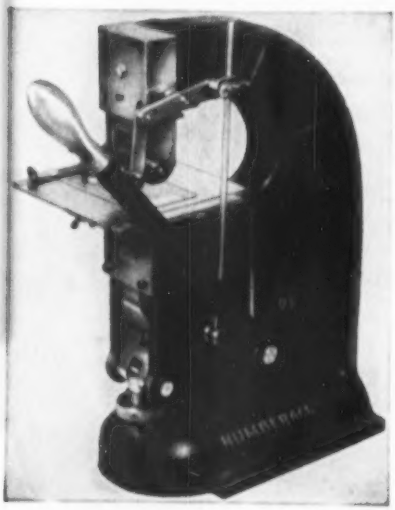
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nets, with a unique roller arrangement that provides for easy handling of the sheet when feeding the shear. There is no noticeable drag on the sheet due to the magnetic holding action, and the pieces are automatically stripped off the support as they are cut. The support is designed to handle all magnetic materials up to 16 gauge thickness and can be supplied with either a 36 or 48-inch back gaging range.

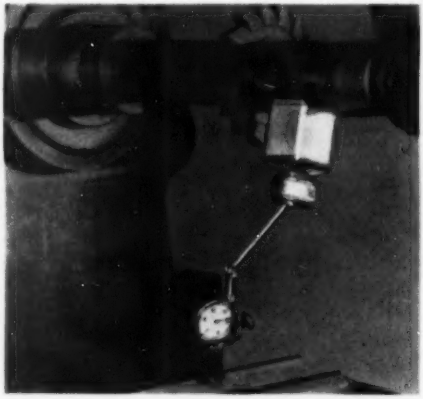
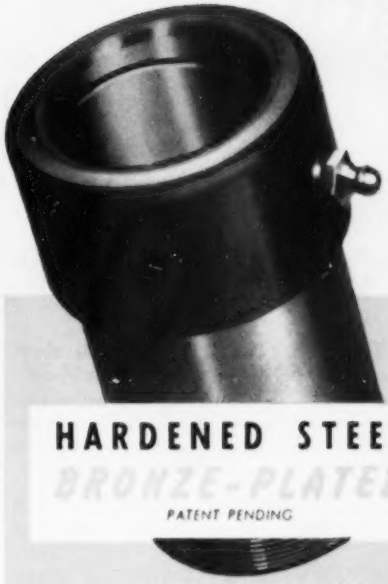


Illustration showing a magnetic base holder designed for use with test indicator. The holder features a universal ball and socket and swivel arm construction and may be mounted on any round or flat, iron or steel surface. Illustration courtesy of Enco Manufacturing Company.

Another recently developed device is a magnetic base holder designed for use with test indicators and Handi-Lites. The holder, which features a universal ball and socket and swivel arm construction, may be mounted on any iron or steel surface, either round or flat. The powerful Alnico magnet incorporated in the unit is claimed to exert a pull of approximately 50 lb. and is said to last for many years without being re-energized.

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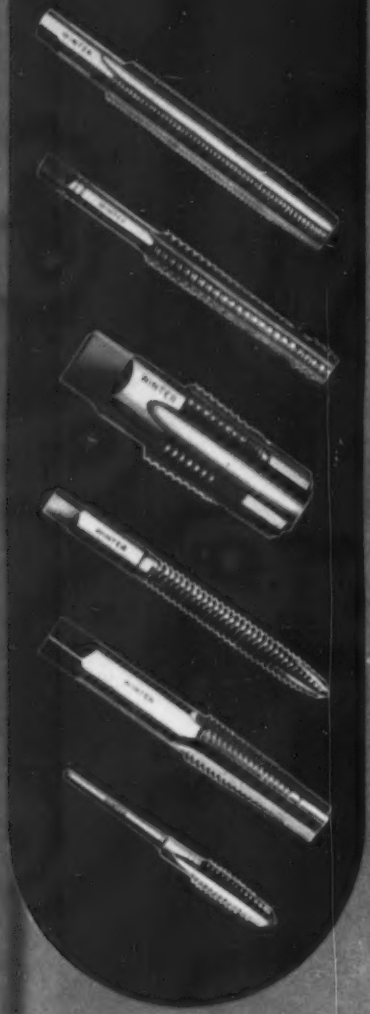
Full information is contained in Circle R's Catalog M, available on request.



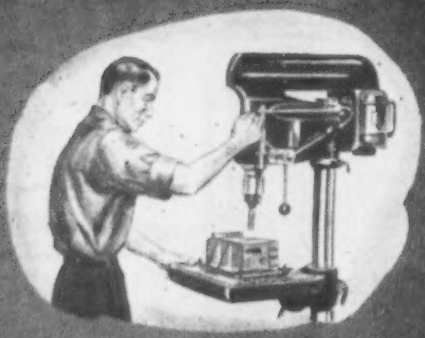
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Air Tool Operation and Maintenance

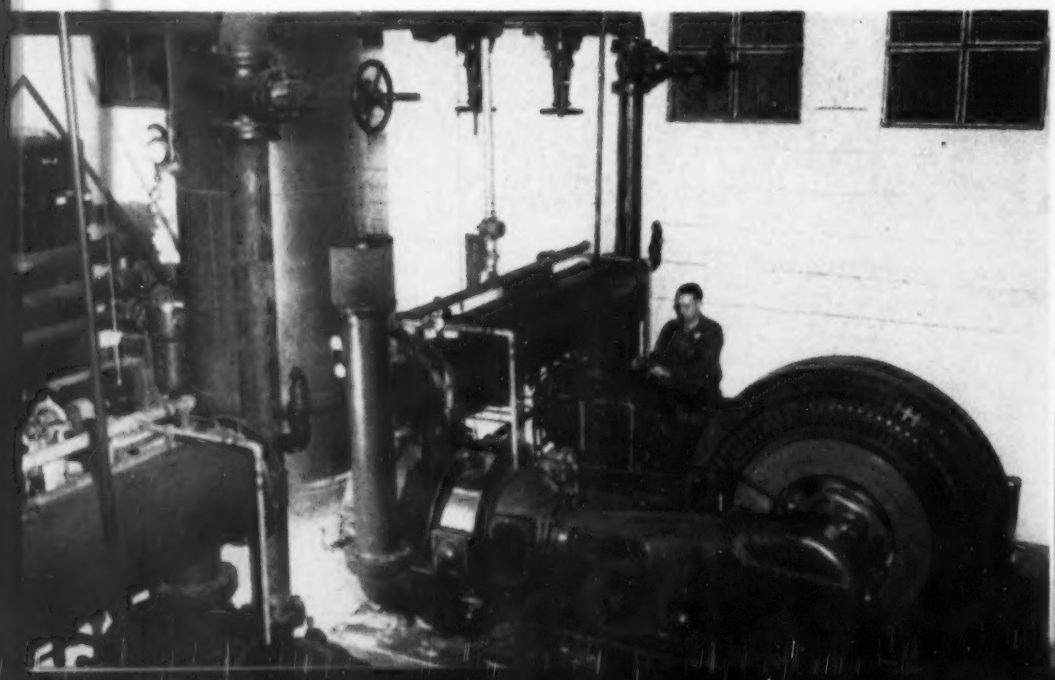
In this article the author explains the importance of clean, dry air of proper quantity and pressure to air tool performance.

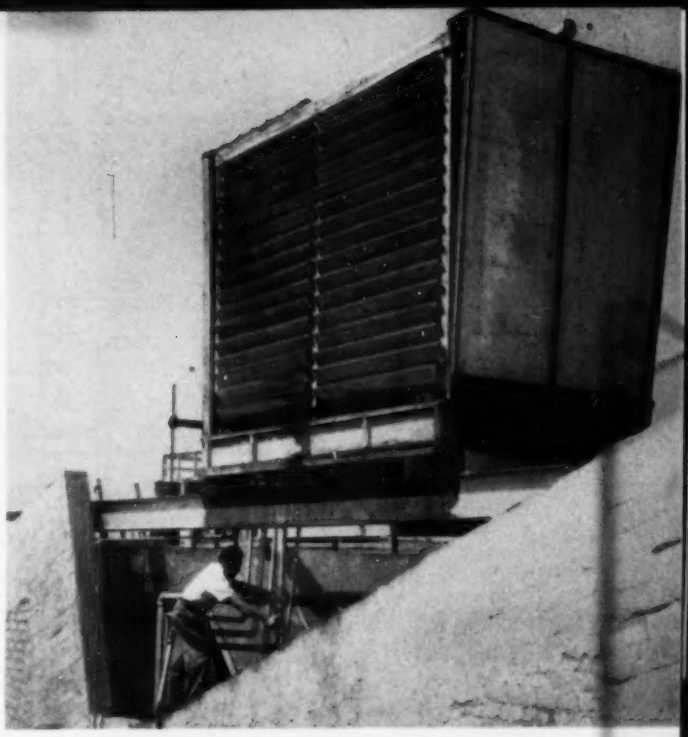
By Gilbert C. Close

BECAUSE compressed air systems are usually plant-contained, with origination, distribution and final use of the energy entirely up to plant engineering personnel, any discussion of efficient use and maintenance of air tools must encompass the system as a whole. A discussion of air tools alone, without reference to power sources or the condition and pressure of the air when it reaches the tool, would be meaningless.

Installation and operation of a compressed air system to obtain utmost efficiency at moderate cost involves a number of factors. First, the total amount of compressed air required must be calculated and compared

This two-stage compressor with intercooler and aftercooler equipment is one of the several that furnish compressed air at the El Segundo plant of Douglas Aircraft Company. Total plant consumption exceeds 4,200 c.f.m.





This overflow water tower located on the plant roof is used for cooling the water which, in turn, cools the compressor and intercooler and aftercooler installations.

with peak and minimum load demands. Second, the right type of compressors must be selected, and these compressors must discharge into receiver tanks of sufficient volume to take care of intermittent loads which may exceed compressor capacity. Third, the main distribution system must be designed and installed in a manner to deliver the air to the point of use with minimum pressure losses and in a clean and dry condition. Fourth, take-offs from the main distribution lines must be correctly installed and the air hose leading to the tool must be as short as possible and of sufficient i.d. to prevent pressure losses. Fifth, the air tool must be well suited to the type of work it must perform. And last but not least, the entire system from intake to air tools must be kept in tip-top condition by constant and vigilant maintenance.

It is immediately obvious that these system requirements are interdependent. That old "weakest link in the chain" adage applies very well here. The efficiency of any compressed air system drops rapidly with overloading, and the best air tools will fail to operate efficiently unless clean air at the right pressure is delivered to the intake fittings of the tools.

The determination of plant-wide compressed air requirements, either prior to installing a new system or to ascertain the loads being imposed on the one currently in operation, is not a simple undertaking. As most air tools are operated intermittently, the time factor plays a large part in calculating total air consumption. Thus, if an air motor on a hoist uses 30 c.f.m. during actual operation but operates only 10 per cent of the time, average use is only 3 c.f.m. The same applies to other intermittently operated tools.

Table No. 1 illustrates a method for determining average plant air loads. Each tool in the plant is listed along with its c.f.m. requirements while operating. The percentage of time the tool actually operates is then used to calculate its average requirements. It is logical to assume that in a large

Table No. 1—Typical Chart for Calculating Compressed Air Consumption

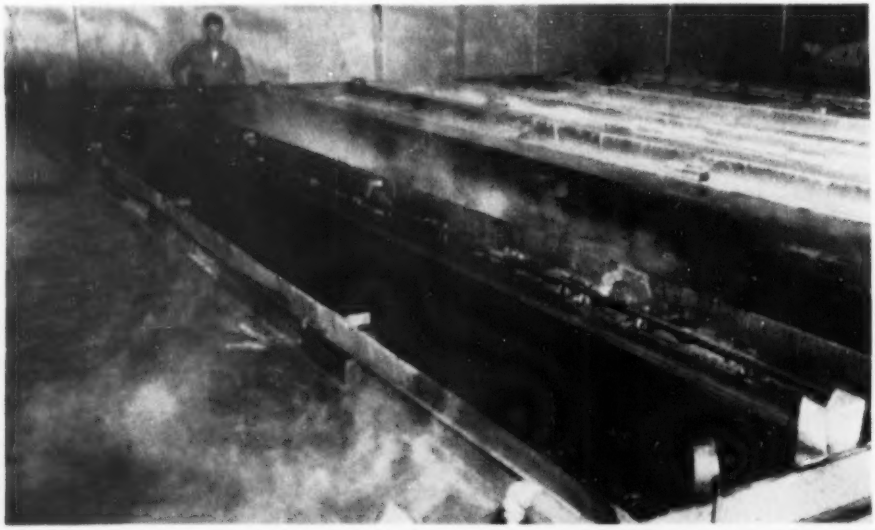
Tool	C.F.M. Used While Operating	Percentage of Time Used	Number in Use	Total Average Consumption
Hoist*	30 c.f.m.	10%	5	15 c.f.m.
Drill	8 c.f.m.	30%	45	10.8 c.f.m.
Agitators (solution tank)	2 c.f.m.	100%	6	12 c.f.m.
Air Hammer	12 c.f.m.	5%	1	0.6 c.f.m.
Total Average Consumption				38.4 c.f.m.

A table like this makes it simple to figure average air consumption. First list the tool, then the c.f.m. of air used while operating. Next, closely estimate the percentage of time the tool actually operates. This gives the average consumption per tool. This average consumption per tool multiplied by the number of tools in use gives the average consumption of all similar tools in the department or plant.

* 30 c.f.m. x .10 x 5 = 15 c.f.m. average consumption for all five hoists.

plant operating under normal conditions, intermittent use of the air tools will be so spaced that average air requirements will prevail.

In most cases, manufacturing data on the air tool will give the c.f.m. required during operation. When this data is lacking, a flowmeter connected between the air hose and the tool while the tool is operating under full load may be used. However, when using a flowmeter, it must first be ascertained that correct air pressure also prevails, otherwise a faulty reading will



Agitating an anodic tank with compressed air. Note rising air bubbles. The small space required by the air pipes is a particular advantage since the pipes do not obstruct tank volume.

An automatic air drill being used to drill deep holes in a three-inch aluminum spar cap. The drill is air-fed and the operator has only to hold it in place.



be obtained. A flowmeter may be used also in determining the air requirements for steadily operating air equipment such as solution tank agitators, automatic spray pots, siphon equipment, and so on.

This survey of total air requirements will be useful in determining whether current compressor capacity is sufficent, or, if new equipment is to be installed, the type and size of compressor to buy. Furthermore, during the plant survey, the areas using the greatest amount of compressed air should be noted. If these areas are widely decentralized, or located in different buildings, it is highly probable that several smaller compressors located near the decentralized areas of greatest use will be more efficient than a single compressor of large capacity. Using several smaller compressors rather than a single large one will vastly simplify air distribution by eliminating long lines, and there will always be standby units when one compressor is shut down for overhaul and repairs. This simplification of distribution and the safety factor involved will often more than offset the lesser efficiency of smaller compressor equipment.

When a large volume of compressed air is used, a two-stage compressor with an intercooler between the low and high pressure cylinders and an aftercooler between the high pressure cylinder and receiver tank will undoubtedly prove most efficient. Such compressors are designed to deliver between 5.2 and 5.4 c.f.m. of compressed air per b.h.p., which is substantially above most smaller single-stage compressor units.

The importance of intercooler and aftercooler equipment should not be overlooked. To begin with, these coolers reduce the temperature of the air and substantially increase its volumetric efficiency. Secondly, by cooling the air, they reduce its tendency to hold moisture and act in effect much like a water trap. This early elimination of moisture reduces rusting in the distribution lines and provides dry air for tool operation. As moist air seriously interferes with proper tool lubri-



Routing aluminum with an air tool. Lightness and speed of the tool are important to this operation.

cation, and as improper tool lubrication is the greatest air tool maintenance hazard, it is evident that intercooler and aftercooler equipment is vital from the maintenance standpoint.

For maximum efficiency, both intercoolers and aftercoolers must in themselves incorporate an efficient cooling system to carry away the heat removed from the compressed air. At the El Segundo plant of Douglas Aircraft Company, where some 4200 c.f.m. of compressed air is used, heat is carried away by circulating water systems leading to conventional overflow cooling towers located on the plant roof. This method has proved very effective for the Douglas installations.

The lines used in distributing the compressed air to the various points of use can make or break the efficiency of any system. In general, the pressure drop between the receiver tank and the point of use should not average more than 10 per cent and should never exceed 15 per cent. Low air pressure at the point of use is the prime cause of poor air tool efficiency.

The amount of air required in any one location and the distance of this location from the compressor dictate the size of air pipe that must be in-



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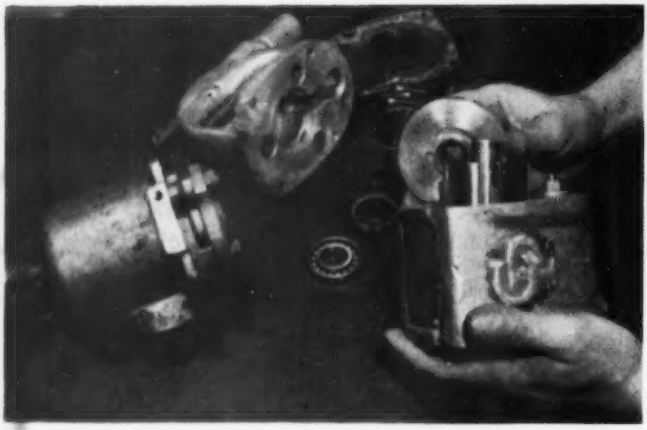
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Repairing and adjusting an air impact wrench. When tools need repair, complete disassembly, cleaning and relubrication should be performed.

stalled. Complete data on this may be found in the Compressed Air Handbook, Copyright 1947, of the Compressed Air and Gas Institute. When possible the loop system of air pipe installation should be used. This means simply that both ends of the main distribution pipe are connected to the air supply, thereby providing a two-way path to the point of use.

The importance of proper air pipe size is stressed by the fact that pressure drop in the pipe corresponds roughly to the square of the velocity of the air through the pipe. This means

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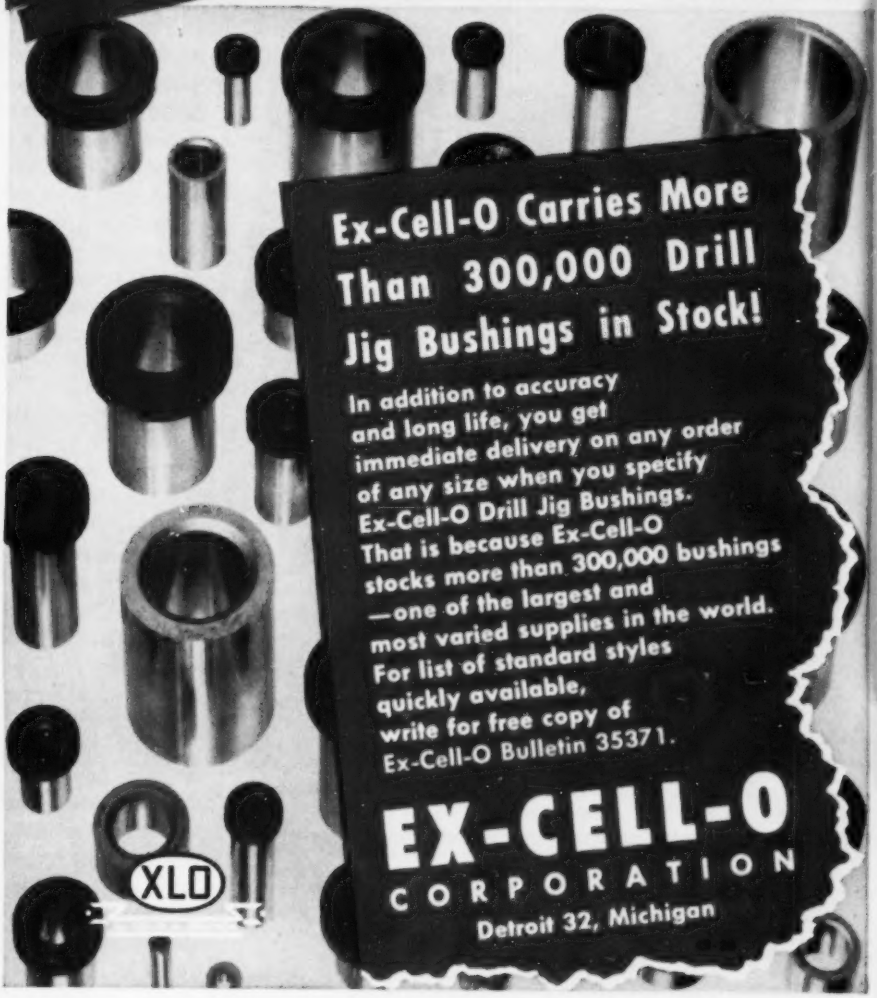
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that if the velocity of the air is doubled by doubling the load, the pressure drop that already exists is increased four times. The seriousness of this situation can be illustrated by a simple example. When 250 c.f.m. of compressed air is conducted to the point of use through a 1¼-inch main line, the pressure drop is about 4 lb., or well within the permissible 10 per cent average drop. However, when 500 c.f.m. of compressed air is conducted through the same line for the same distance, the pressure drop is about 16 lb., or well above the permissible limit. These figures are based on 100 p.s.i. system pressures.

When a plant-wide survey of compressed air requirements shows that current air pipe installations are too small, either new and larger pipes should be installed, or a parallel piping system must be used. Trying to continue operations with the present equipment will result in a reduction of air tool efficiency that will soon prove more costly than either remedial measure. Also, at the time of enlarging the air distribution system, possible future demands should be taken into consideration. Labor is the most costly factor involved in air pipe installation, far exceeding the cost of slightly larger pipe.

Water traps should be installed at appropriate points in the main distribution lines, and all piping should run at a slight slant toward frequent



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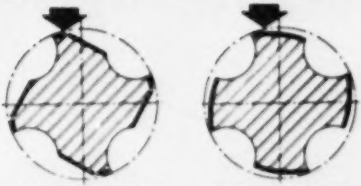
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automatic drain legs. Take-off connections should be made on top of the main pipe to aid in preventing water from leaving the main line and entering the hose leading to the tool. When especially dry air is required for operation of specific tools, such as an automatic paint pot, a filter should be installed between the main line and the tool. These filters will supplement the work of the filtered air inlet to the compressors and other filters located at strategic points in the system.

Maintaining the correct pressure in the main lines is no more important than maintaining pressure through the air leading to the tool. In fact, in many plants with otherwise efficient systems, very little attention is paid to the type of air hose employed and its ability to deliver air to the tool with a minimum of pressure drop.

R. J. Brady of the Douglas plant engineering department and in charge of air tool operation points out that hose lengths in that specific plant are limited to 20 feet with an i.d. corresponding to the c.f.m. of compressed air that must be delivered to the tool. These hoses are maintained in good condition and replaced immediately when they become defective. Hose menders are never used due to the restrictions they impose on air flow. By establishing standards of hose length and i.d. as related to the volume of air that must be carried, very little

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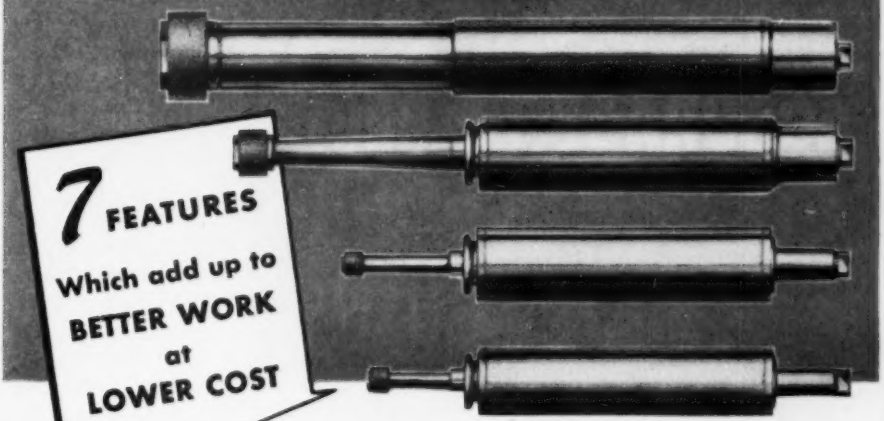
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trouble will occur from this source.

A hypodermic-needle air gage is a useful instrument for determining hose air pressure just before it enters the tool. This instrument may be inserted through the hose without causing a permanent leak and is very useful for checking the air pressure reaching the individual tools. If the pressure in the main line is up to standard, but the pressure reaching the tool is too low, a larger air hose should be installed. Pressure readings with this gage, of course, should be made with the tool operating at full load so that maximum main line and hose pressure drop exists at the time the reading is made.

R. J. Brady points out that at the Douglas plant all factors concerning a job are carefully analyzed before deciding to use an air tool in its accomplishment. The cost of air power as a source of energy is about five times that of electricity, but with certain types of tools this cost is offset by lower tool maintenance costs. Air tools are generally lighter and more portable than electric tools for performing the same job, and when low speeds or a wide range of speeds are required, air tools are recommended. Impact riveting, squeeze riveting, drilling and routing are jobs for which air tools are particularly recommended. Regulation of tool speeds at Douglas is accomplished by installing a simple shutoff valve be-

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Air-operated impact wrench being used in assembling an airplane jig structure.

tween the air tool and the air hose.

From the maintenance standpoint, the compressed air system in the Douglas plant receives the same critical attention accorded other production equipment. Compressors are thoroughly checked once each week and any adjustments or minor repairs necessary are made at that time. All air filters are changed as soon as they become dirty. Automatic water traps and automatic drain legs are inspected for proper operation, and manual water traps are emptied at frequent intervals. The intercooler and aftercooler cooling system is kept free of scale. Pipe lines are watched for leaks, and all hoses are inspected regularly. The importance of catching and eliminating line leaks is emphasized by the fact that in a system operating at 100 p.s.i. a $\frac{1}{16}$-inch hole will cause the lose of approximately 182,000 cubic feet of air a month. This alone is enough to destroy the efficiency of a small system.

At the Douglas plant, some air tools are issued directly to an employee on a tool check for temporary use, others are issued to employees on permanent checks, while still others are issued to the department where they are used and left permanently installed. When



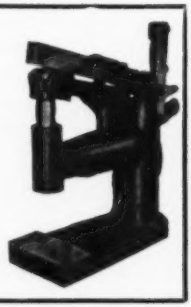
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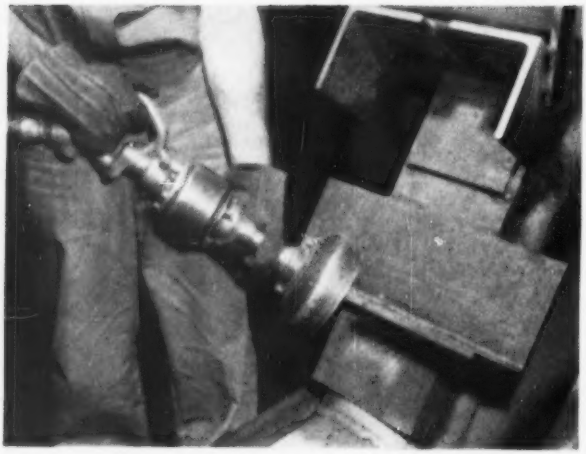
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Air-operated grinder being used on a jig fixture. Note shield over grinding wheel. Here again lightness in conjunction with power adapt the tool to this type of work.

practical, this latter method is a time-saver as the employee entering the department on a new workshift has only to pick up the tool and go to work.

When a tool becomes defective or sub-par in operation, it is deposited at a pickup point in the department. Once each day a tool truck from the tool maintenance department makes the rounds and gathers these tools for repair. They are transported to a centralized repair shop where they are disassembled, cleaned, lubricated, and readjusted for use.

Brady points out that improper lubrication is by far the biggest trouble-

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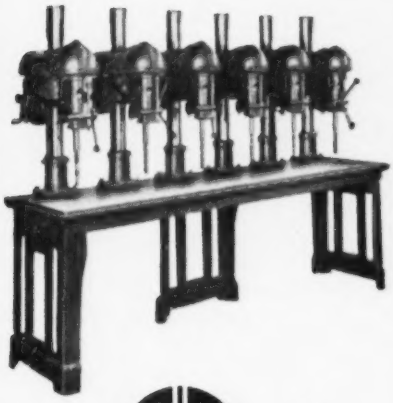
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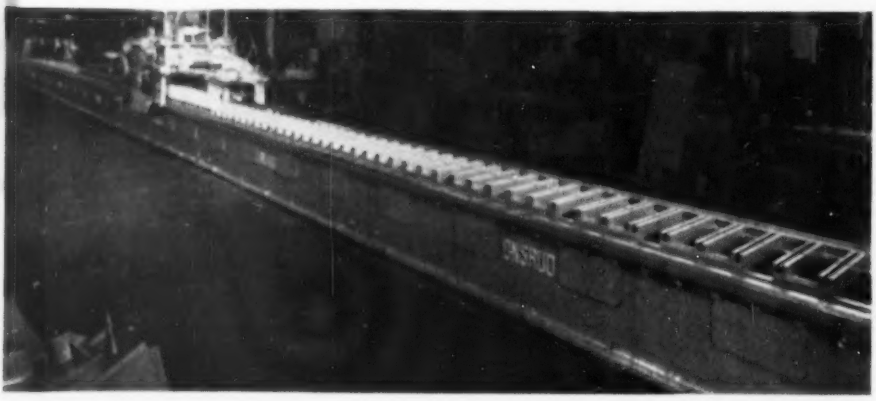
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maker. This may be due to lack of knowledge on the part of the user, or caused by line moisture in sufficient quantity to interfere with lubrication. Unbalanced tool rotors are another source of trouble, and rotor balance should be checked when the tool begins to vibrate excessively, or when it is disassembled for routine repair.

"Employee education is an important function in conjunction with the use of air tools," Brady says. "To begin with, when an employee is used to using electrical tools he must overcome certain mental reservations in regards to air tools. Then he must be trained to employ the air tool in the most useful way and to keep it properly lubricated. It must be called to his attention that compressed air, unlike ordinary air, is an expensive source of energy and must be used accordingly."

To summarize briefly, successful air tool operation and maintenance depend as much on the compressed air system as a whole as upon the design and adequacy of the tool itself. The tool cannot operate efficiently unless air in the proper quantity and at the proper pressure is available at the point of use. To reduce maintenance, this air must be as clean and dry as possible. It is thus evident that the best air tool made will fail to come up to expectations if powered by an inferior compressed air supply. The problems encountered begin when air is first drawn into the compressors from the outdoors and end only when the air tool has efficiently accomplished its job. Any attempt to compensate for system deficiencies other than by direct remedial measures, will only lead to trouble, increased costs, and lowered air tool efficiency.

THE accompanying illustration shows a new spar miller recently installed in Boeing Airplane Company's Seattle plant. With an overall length of 105 feet, this unit is believed to be the longest milling machine ever built and will be used to production machine a variety of Boeing parts. The machine consists of several bed sections ground to a uniform plane. A carriage rides on and travels the length of the bed, which is 90 feet long. The carriage is equipped with four cutterhead motors, providing a total of 200 h.p. The machine, which weighs approximately 120,000 lb., was built by Onsrud Machine Works, Incorporated of Chicago.





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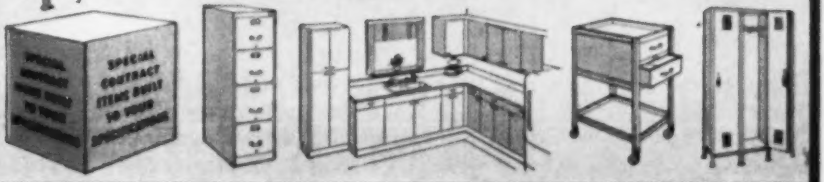


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C. W. Hinman

Handling Work on Circular Dials

The author discusses the use of a circular dial feed in conjunction with die sets for punching and assembling a variety of parts.

By C. W. Hinman
Designing Engineer

A HORIZONTAL circular dial provides an efficient means for performing a wide variety of press operations on a high speed basis, including assembling, blanking, forming, perforating, spot welding, and other operations. Such dials provide for maximum safety in use since the operator loads the work parts on the front edge of the dial as it is indexed around while the punch closes on the work and die at the rear of the dial. This arrangement eliminates any necessity for the operator to place his hands or fingers near the danger zone of the punch and die. Ejection of the finished work can be easily accomplished either by pushing the work out through a hole by a finger in the next station following the final operation or by using hooks and clamps to lift out the work. Sometimes compressed air is used to blow the work behind the press.

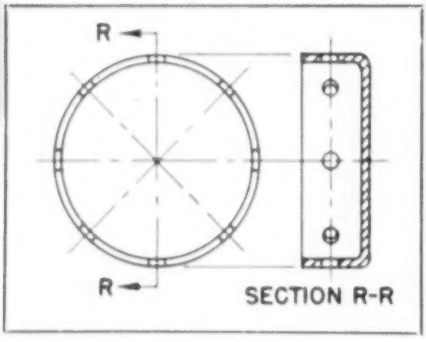


Fig. 1—Sketch of drawn cup with eight equally spaced holes through the wall

The first tool designing problem to be presented in this article involves a punch and die for perforating eight equally spaced round holes through the wall of a drawn cup of the type shown in Fig. 1. The work material is 3/64-inch S.A.E. 1010 sheet steel. The annual output runs well over 100,000 parts, and the size of and distances between holes are specified plus or minus 0.001 inch. Therefore, tool cost is not

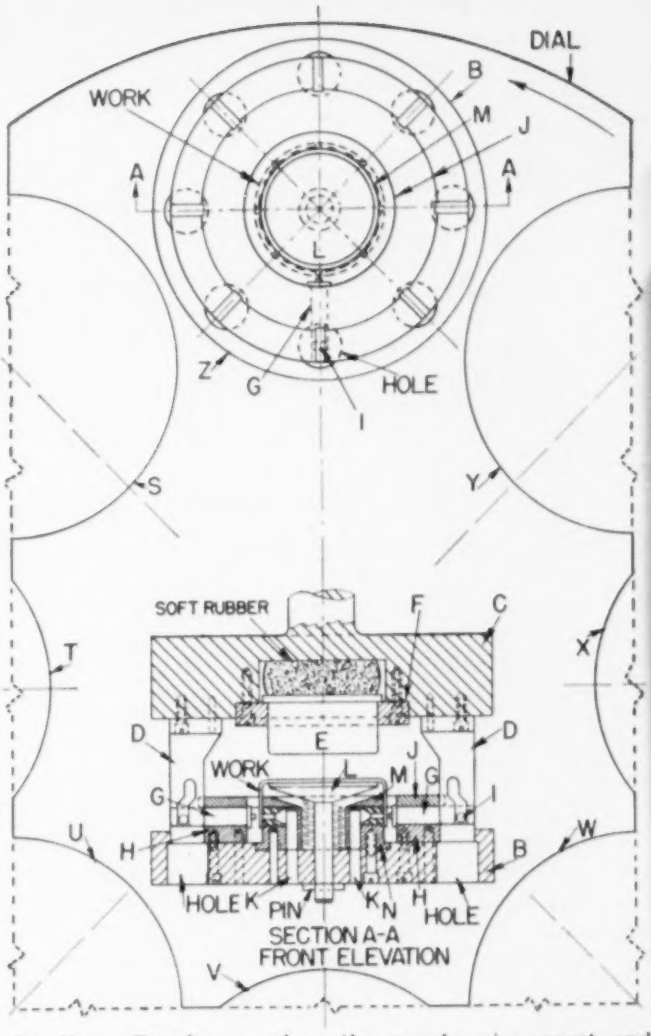


Fig. 2 — Drawing illustrating use of punch and die unit in conjunction with dial feed for perforating holes in cup shown in Fig. 1

a factor; however, for high speed uninterrupted operation and accuracy of dimensions in the finished work, a dial feed of the type shown in Fig. 2 is used.

Eight completed dies are assembled in an equally spaced manner around the edge of the dial as indicated at stations **S, T, U, V, W, X, Y,** and **Z.** Only one punch is used. This punch, which is located at station **Z,** is attached to the press ram and is shown in the sectional sketch **A-A,** which represents the front elevation. Punch holder **C** contains eight equally spaced side cam punches, two of which can be seen at **D-D.** In descent, these cam punches, which are of ¼-inch thick steel, enter corresponding slots in plate **H.** The offset cam slots, **I,** in the ends of the cam punches straddle pins through punches **G** and serve to open or close the punches in ascent and descent. The cam punches also serve as guides for the punch holders, thus eliminating the need for standard guide posts.

The bodies of punches **G** are square but each contain a round central pin. These pins serve as cutting punches for perforating the holes as they enter

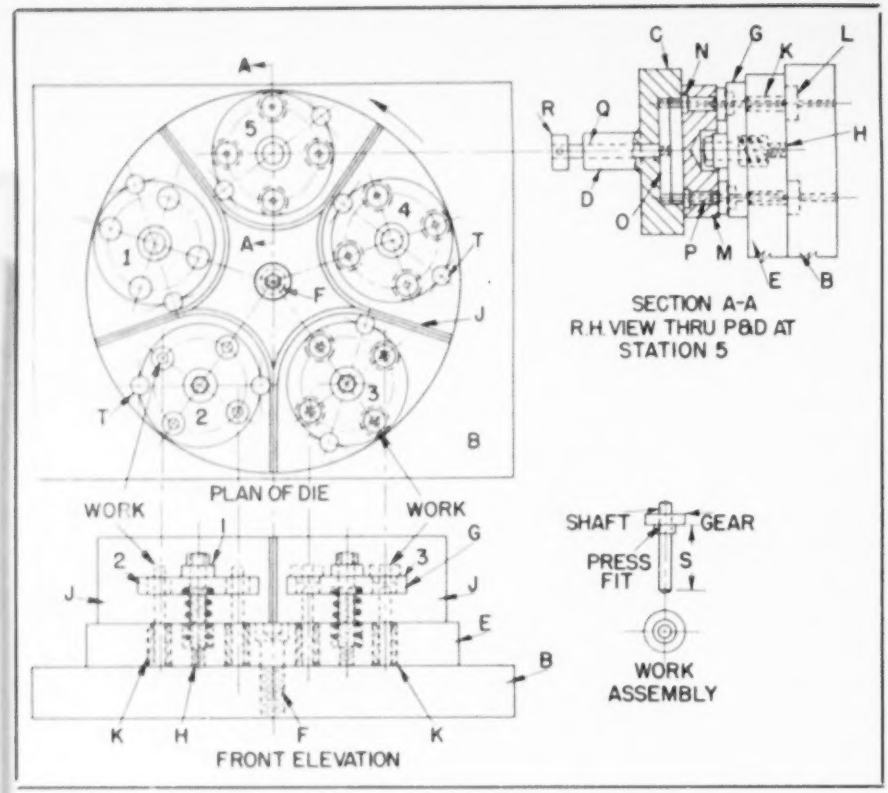


Fig. 3—Drawing of dial and die setup for press fitting gears on shafts

the bushed dies in stud **N**. Vertical holes **K** permit the cut slugs to fall out through stud **N** and die shoe **B**. The work is placed at stations **U**, **V**, and **W** mouth down over spring pad **L**, plate **M**, and stud **N**. Plate **J** is a ring cover for the square bodies of punches **G**. Round holes drilled through die shoe **B** and located directly under cam punches **D** are clearance holes for the cams so that they are permitted to descend sufficiently to complete the operation.

After placing the cups on the dial at the lower stations, the cups are carried around for perforating the eight holes at the top station, **Z**, which is located directly under the press ram. When the ram descends, punch **E** with a strong rubber block above it pushes the work down against spring pad **L**. Continuing to descend, pad **L** registers in the angle of plate **M**, while side cams **D** have advanced punches **G** up to the work. The soft rubber block "gives" a trifle after pad **L** registers to permit punches **G** to perforate the holes.

A limit switch governs the indexing action of the dial so that the ram cannot descend until all of the side

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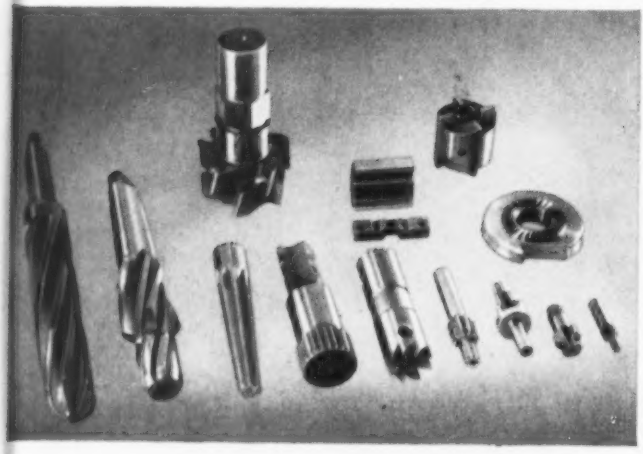
cams **D** are in their correct positions over the eight slots and clearance holes through die block **B**. The finished work is ejected at station **S**, first by spring pad **L** on its upstroke and secondly by a pair of vertical clamps that grasp the work and elevate it above the die where it can conveniently fall out to the rear of the press.

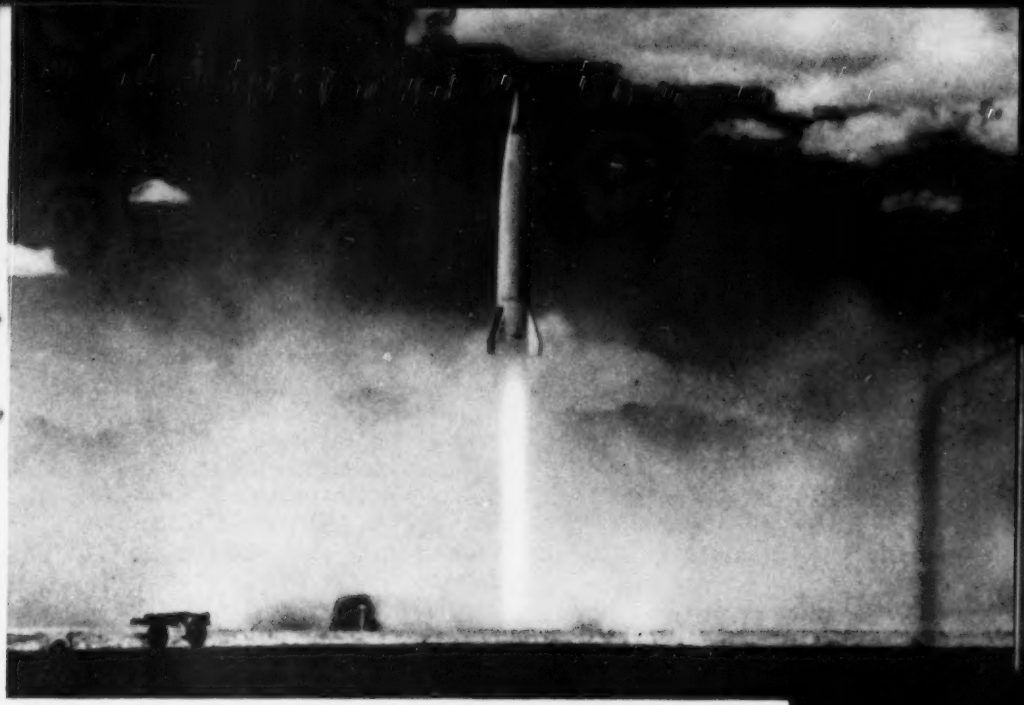
An Analysis of the Die

The die illustrated in Fig. 2 is not expensive to build since all of its parts are round and can be turned on a lathe. Punches **G** can also be turned and drilled on a lathe and their bodies squared in multiple lots on a milling machine. All of the parts can be finished in multiples and the necessary holes drilled with a few plate jigs.

If the press is operated at a speed of 60 strokes per minute, a gross output of 3,600 perforated cups can be obtained hourly. With two operators feeding the dial output can be doubled by using 120 press strokes per minute. Net production is approximately 10 per cent less than the gross output.

The punch and die unit just described and the next one to be explained indicates to some extent the operations of the modern presses and dies that form blanks and assemble them with other work pieces without being touched by


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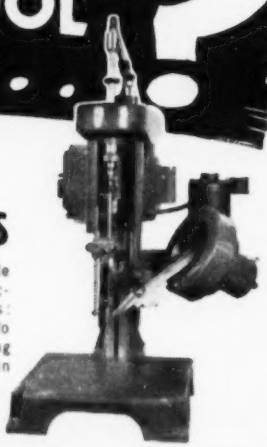
human hands. In some cases, the movement of an operator's hand may be duplicated by a "mechanical hand" having either fingers or a suction cup to lift the work and move it into its correct position in the assembly being made and to release it. The mechanical hand does not eliminate the operator but makes his job easier and safer since it prevents him from using his own hands in dangerous parts of the machine.

Assembling Work Parts on a Dial

Figure 3 shows the design of a press-fit assembling die for attaching a gear on a shaft. Such dies are used in producing partial assemblies for business machines, instrument and power panels, light machinery, and clock mechanisms. With the exception of clock assemblies, it is usually necessary to press fit and "ring stake" the parts together simultaneously.

This die has five dial stations and comprises the following parts: die shoe **B**; punch holder **C**; punch shank **D**; dial **E**; center screw **F** in dial; five spring-pad work tables **G**; stripper screws **H**; stripper screw washers **I**; guards **J** for work tables; bushings **K** for locating work shafts; hardened wear plugs **L**; punch **M**; spring collets **N**; ejector bar **O**; ejector pins **P**; vertical ejector rod **Q**; ejector block **R**; and guide pins **T** for the work tables. **S** is a constant dimension after assembling the gear on its shaft. The work shaft is steel and the gear is phosphor bronze. The die provides for maximum safety of use. Parts are loaded at stations 1, 2, 3, and 4, and only one work table is depressed by the punch descent at station 5.

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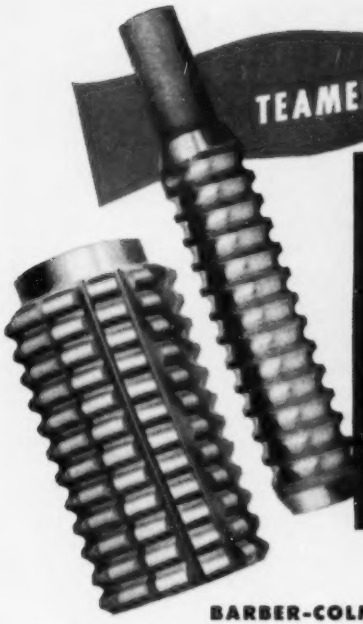
Operation of the Die

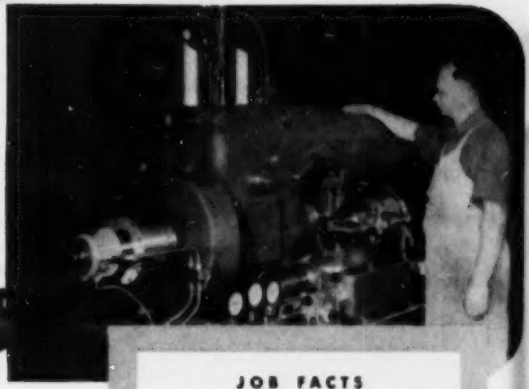
Two operators load the parts into the die. One operator at the left places the shaft down through the holes in the work tables and enters them into bushings **K** in dial **E**. The operator at the right places the hubs or gears into the work table and in so doing pushes down the previously entered shafts if any of them project above the table surfaces. The hubs on the gears have an easy slip fit into the bellmouthed holes in the tables.

The dial tables and work are indexed from station to station. When a loaded table is stopped under the punch at station 5, the press ram descends and the punch depresses the work table **G** against dial **E**. The punch in descent pushes the four gears down and, the center holes of the gears being aligned with the shafts, the gears are press fitted onto the shafts. At the completion of the downstroke, four gears and shafts are assembled completely, as shown at **S**. The ends of the shafts are supported on hardened wear plugs, **L**, which accommodate the thrust occurring in press fitting the gears.

At the completion of the downstroke, the upper ends of the shafts enter spring collets **N**. When the punch ascends, the spring collets lift the assemblies from the work table and, with the punch continuing to ascend, block **R** contacts the ejector bar **Q** in the press head which pushes the four assembled work parts from the punch. The method of ejection is that block **R** depresses bar **Q**, pad **O**, and pins **P**, and the pins force the work shafts out of the collets. The assembled work falls within guard **J** and the press, being tilted back, causes the work to

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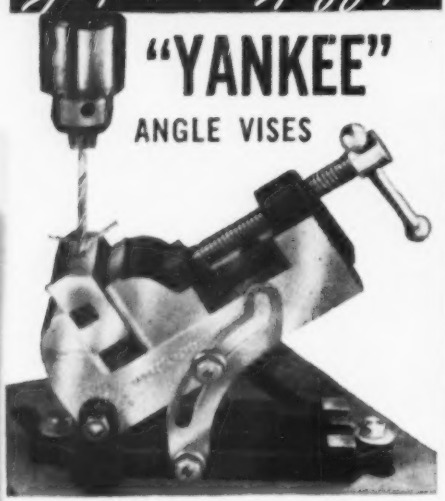
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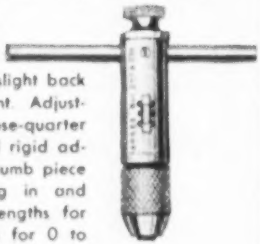
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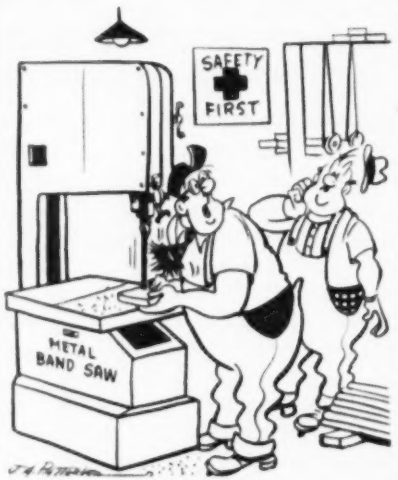
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slide away from the dial into a receptacle placed behind the press.

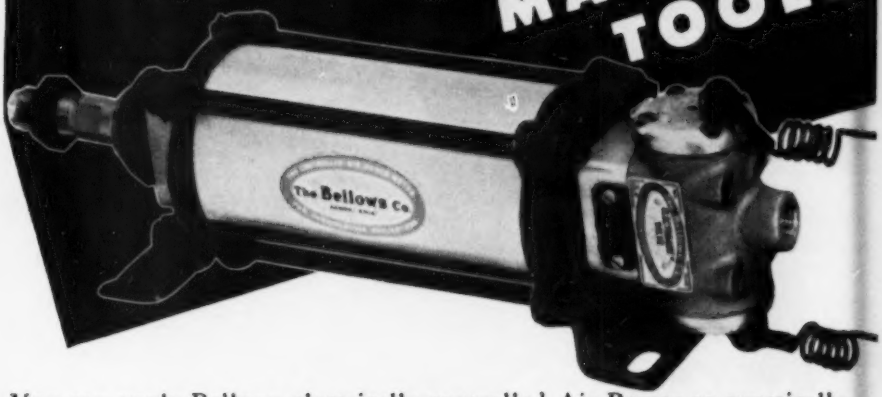
Each work table is provided with two guide pins, **T**, which maintain the table holes in constant alignment with bushings **K**. Guide posts are not required for this die set. By setting up the die in a press having only 20 strokes per minute, a potential output of 4,800 assemblies per hour was obtained. By using compound types of assembling dials, it is possible to obtain even larger hourly outputs. And by increasing the dial diameter, the number of stations, and the number of holes in the work tables, and by employing four or more operators, the hourly output may be still further increased.

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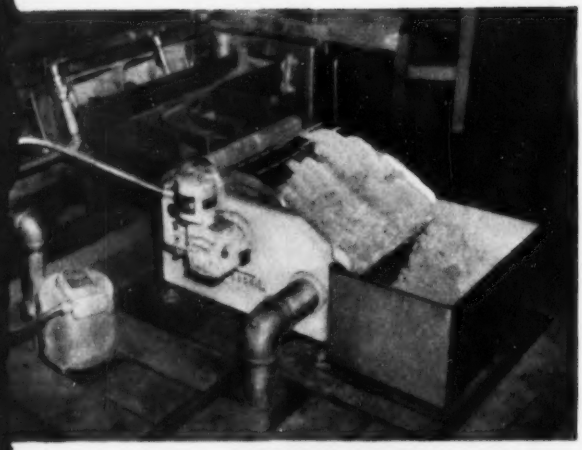
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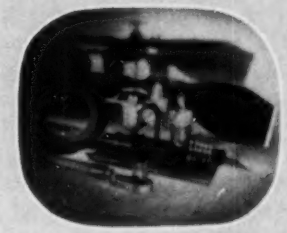
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A Neglected Responsibility of Management

In which the author discusses the factors involved in a sound machine tool replacement policy.

By Harry J. Loberg*

THE management of any concern is charged with the responsibilty of making a reasonable profit each year if at all possible; for this is the only way a manufacturing establishment can continue to create goods and contribute to the economic welfare of this country. Continued lack of profits over a period of time means failure, and failure is an economic loss that affects everyone—workers, stockholders and customers. This statement may seem to be elementary, but it is so basic that the principle can easily be overlooked on both a short and long term basis.

Many decisions that management must make today have a direct bearing on the profit picture of the future, but the pressure of day-to-day events tends to cloud the issue. Fundamental to continued success and progress is a sound replacement policy which leads to increased productivity per worker. This aspect of management is easily neglected; for the lack of a sound policy may not be a primary consideration for a number of years. Unfortunately, when the crisis occurs, due to neglect, only drastic and costly action will suffice, and this may be too late.

Most concerns have to meet competition on reasonably equal grounds. Prices charged for comparable goods must be somewhat alike. Even wages paid to labor cannot be too different in these days of nationwide bargaining. An important factor in this never-ending competitive struggle is the productivity level of the workers, which in turn hinges mostly on the efficiency of the equipment they operate. A pace-killing operator with antiquated equipment cannot equal the normal operator with up-to-date equipment, no matter how willing he is. For example, if it takes two minutes to produce a given part on a particular machine, the production is 30 pieces an hour. If a new machine will reduce the time by 25 per cent (not an uncommon occurrence), the production rate has gone up 10 pieces an hour to a total

* Professor and Head, Department of Industrial and Engineering Administration, Sibley School of Mechanical Engineering, Cornell University. Author of "Machine Tool Selling."

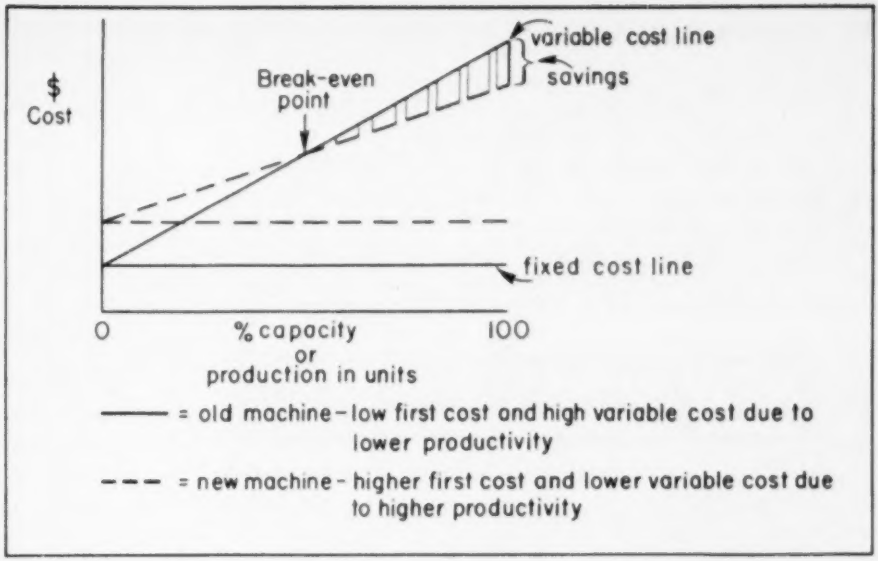


Fig. 1—Graphic presentation for use in replacement studies.

of 40. Expecting the typical operator to overcome this handicap is wishful thinking at best. As the relative efficiency of equipment in any given plant decreases, its competitive position gets poorer, even though the change may be gradual, to the extent that it is not noticeable from day to day.

The present economic straightjacket that such industries as coal mining, textile, construction, and so on, in England find uncomfortable is due, in part, to management's neglect of the responsibility to maintain productivity by adequate equipment replacements. Her own economic studies bear out the truth of this general statement. An inadequate replacement policy in effect for many years placed many English concerns in a poor position to meet world-wide competition.

Our standard of living, which the worker thinks of as increased wages, is based on increased production per worker per unit of time. It is not the dollars earned but what the dollars will buy that determines the standard of living. Progress in this direction comes when management is alert to the possibilities of improving plant facilities. Our record is good when compared to other countries; it is short of the real possibilities existing, however, based on studies of the age of equipment in our manufacturing establishments.

It is easy to overlook replacement needs. Unfortunately most machines are not designed on the "one hoss shay" principle. They keep on running and running and with reasonable care look adequate. But an operating machine may not be an economical machine. It may be a thief of profits. Its appearance can be misleading—and frequently is. Only an economic comparison between the old and the new

will determine the real value of the old machine.

When a person has the itch to buy a new car, he usually buys one and then rationalizes why it was an economical purchase so that he can conceal his real motives. Having decided to buy the car, it is easy to salve his conscience with such thoughts as the old one needs a new battery, tires, maybe a ring job, and so on. Parodoxically just the opposite happens when management considers equipment in the plant. As long as the existing machines run, there is no great urge to replace.

In many instances, little effort is made to study the effect of replacement of the most vital competitive factor—lower manufacturing costs. Very few plants make a practice of evaluating present equipment vs. new on a sound and continuing basis. Those that do are the exception and not the rule. As the wages of labor rise, the need for better utilization of its efforts becomes more critical. There are many ways to accomplish greater output in a given period of time to offset wage increases, and one fertile field that needs more active cultivation is the one of replacement studies of existing equipment.

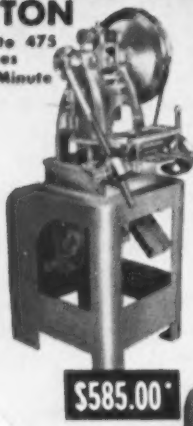
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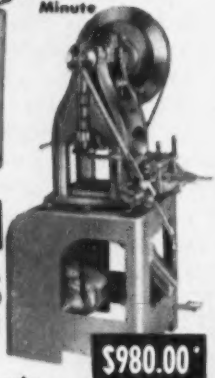
with Built-in Precision Single or Double Feeds

8 TON
110 to 350 Strokes Minute

12 TON
65 to 300 Strokes per Minute



$585.00*



$980.00*



$1340.00*

FEATURES
- Variable Speed Drives
- Positive Knockouts for Compound Dies
- Bronze Bearings Throughout Frame
- Clutch and Automatic Brake Release on 8 to 12 Ton Models

*Prices F.O.B. Chicago. Subject to change without notice. Motor and starter extra.



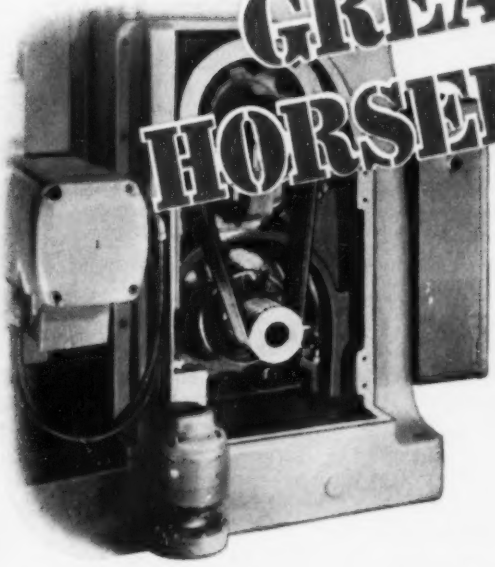
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DI MACHINE CORP.
2714 Irving Park Road, Chicago 18

Some Common Errors

When a new machine is purchased, it is good accounting and management procedure to set up a reserve for de-

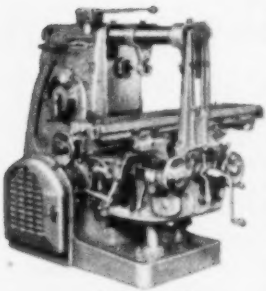
GREATER HORSEPOWER



The increasing use of carbide and cast alloy tools for milling ferrous and non-ferrous materials, has demanded Greater Horsepower to get fullest advantage of these tools. You'll find new CK milling machines meet this demand. Depending on machine size, (No. 2, 3, 4, 5, or 6) you get 10 to 25 hp independent motor drive for spindle plus separate 3 to 5 hp feed and rapid traverse drive. Motors are interlocked with positive automatic safety control for overload conditions. No danger of stalling cutters in cut.

A new line of knee-type milling machines

KEARNEY & TRECKER MILWAUKEE **CK's**



New Model CK
10 hp No. 2 Plain Style
Milling Machine

YES, Kearney & Trecker's new CK milling machines are packed with design and operating features that make them more productive, more profitable for you.

New CK columns give you greater rigidity. Compared to former columns, they give you 1000 pounds more metal in heavier ribbing, in box-type, sponson construction to absorb the heaviest cutting loads.

Spindle-mounted flywheel, broad feed and speed ranges plus Greater Horsepower give you the opportunity to obtain fullest possible benefit from modern cutting tools.

New design 2" diam. table feed screw affords greater bearing contact between screw and nut and is equipped with positive-acting backlash eliminator. Features that guarantee smoother feed for conventional and climb milling, longer screw life and greater accuracy.

For greater production, these machines are equipped with Kearney & Trecker's famous Mono-Level Control that shortens floor-to-floor time, and materially reduces operator fatigue. New, non-glare micrometer dials help avoid costly errors in reading . . . give you a positive lock at every setting.

Automatic flood lubrication in column and knee and positive metered lubrication to table and saddle, plus generously proportioned gears and shafts assure you greater machine life.

Find out for yourself about Kearney & Trecker's new CK line of knee type milling machines . . . how they meet every demand of modern milling practice . . . how they can give you greater production at greater profit.

Sizes are No. 2, 3, 4, 5, and 6 . . . Plain and Universal styles. For complete details, contact your nearest representative or write direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

REPLACEMENT OF OBSOLETE MACHINE TOOLS
IS AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

preciation account to write-off the cost of the machine from earnings and, at least in theory, provide the money needed for its replacement at some future date. This procedure is sound if its limitations and assumptions are fully recognized. The difference between original cost and the sum indicated in the depreciation reserve represents the book value of the machine. In many cases the book value is looked upon as its actual value, rather than the result of the guess of someone, usually an accountant, hedged in by recommendations of the Treasury Department.

The present market value of a piece of used equipment may be considerably different from the book value. At the time a replacement is considered, this difference, whether plus or minus, should be written off to profit and loss. If the old machine does not have the actual value indicated by the book value, the error has been in establishing its probable life. This error should not be continued to penalize the profit possibilities available in the new machine. A fully depreciated machine may be a great economic hazard. It tends to give comfort to the unimaginative and may lead to production paralysis.

The errors that creep in, due to depreciation policies, are not as serious, however, as arbitrary short pay-off periods required by some managements. To say that no machine will be replaced except when the new machine will pay for itself within a year's time is similar to saying that unless a stock pays dividends of 100 per cent a year, it is not worth buying. Conditions vary and the risk factor or ob-

Now.. HYDRAULIC POWER
FOR FASTER . . . MORE ACCURATE
BENDING JOBS



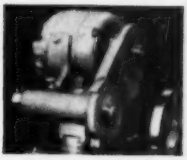
*Fits Any Hossfeld No. 2 Iron Bender

HOSSFELD No. 2
UNIVERSAL PIPE, BAR and ANGLE IRON BENDER with HYDRAULIC POWER

SMOOTH, EVEN BENDS on pipe or conduit up to 2" I.D., without flattening, wrinkling or splitting, can be made fast, accurately, effortlessly, on this NEW Hydraulic Powered Hossfeld Bender. Makes 180° bends—handles flat, square, angle iron and round stock also. Greater versatility—Lower cost.

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External Grinder



Milling Attachment



Handlever Tailstock



Handlever Bed Turret



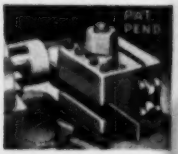
Telescopic Taper Attachment



Handwheel Collet Attachment



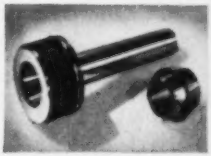
Handlever Collet Attachment



10 in 1 Tool Holder



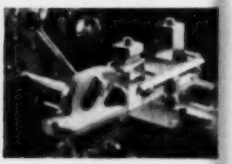
Ball Bearing Live Center



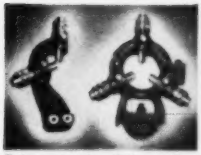
Adjustable Collet Bushing Chuck



Square Turret Tool Block



Handlever Double Tool Cross Slide



Telescoping Jaw Follower Rest and Center Rest



Collet Rack



Steel and Brass Collets



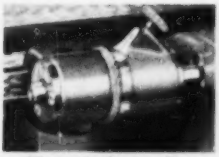
Step Chucks and Closers



Centers and Drill Pads



Thread Dial Indicator



Micrometer Carriage Stop



Four Position Carriage Stop

SOUTH BEND

Lathe Attachments

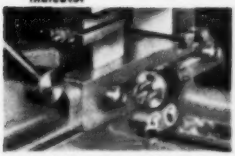
- Cut Production Time
- Simplify Difficult Jobs
- Increase Lathe Versatility
- Speed Up Tooling
- Perform Special Classes of Work
- Reduce Operator Fatigue

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Building Better Tools Since 1906

SOUTH BEND 22, INDIANA



Four Position Cross Slide Stop



Safety and Standard Lathe Dogs



Coolant Pump



Surface Plate, Angle Plate, V-Blocks

solescence element can change the rate of return needed, but arbitrary, short pay-off periods tend to eliminate many worthwhile replacements based on any reasonable calculations.

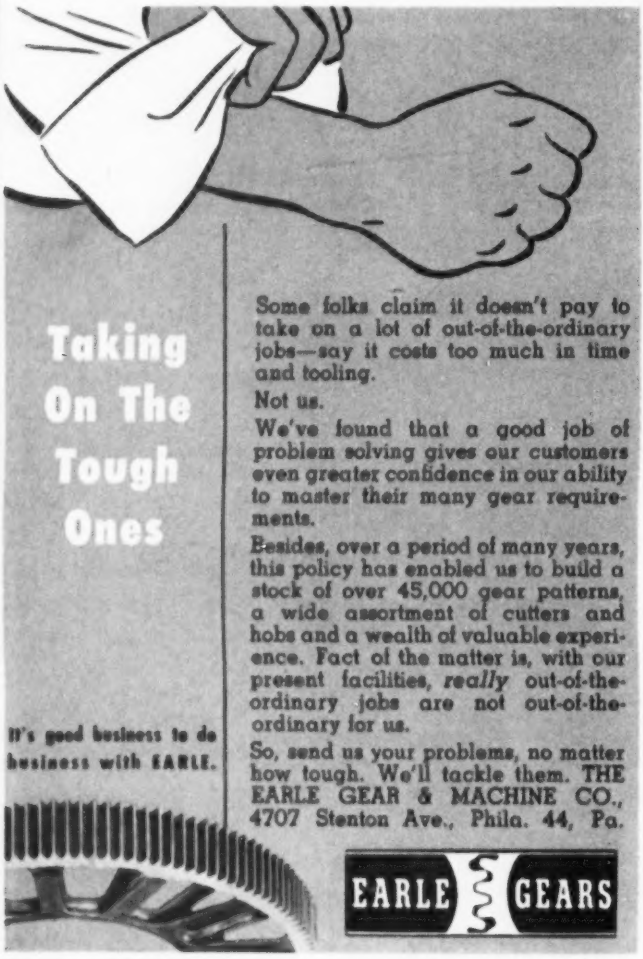
Basis for Comparisons

When an economic replacement study is made of two pieces of equipment, all the operating costs involved for each should be computed on an annual basis. Comparisons can be made for any number of machines, but the typical case involves an existing or old machine and a new one. The old one may be young in years as measured by time, but old when measured in productive capacity. The elements that should be considered and their specific treatment can vary somewhat in detail, but the major elements are:

1. The capital recovery factor—This should include an allowance for depreciation and an allowance for return on invested capital. Allowances for taxes, insurance, and administrative expenses are desirable.
2. Annual cost of upkeep and maintenance.
3. Annual cost of power, supplies, and so on.
4. Annual cost of space allotted to machine.
5. Annual cost of materials.
6. Annual cost of direct labor.
7. Annual cost of indirect labor.

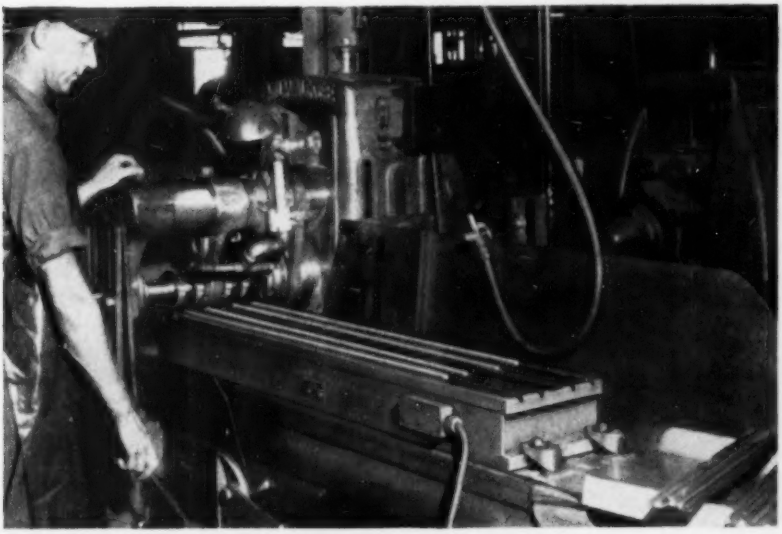
Determining Costs

In determining annual costs some estimates must be made, but with reasonable care these should be reliable.



Tripled PRODUCTION . . .

That's What Remington Rand Did With MAGNA-LOCK Magnetic Chucks



JOB—mill clearance cut and 90° "V" cut on Carriage Rail Lower Race.

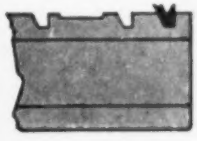
FORMER METHOD — climb milling (2 machines) two set-ups and two manually operated fixtures for each machine.

Production	70 pieces per hour
Cost	$0.0241 each
Rejects	25%
Total Scrap	6%

PRESENT METHOD — climb milling (2 machines) one set-up and one MAGNA-LOCK SUPREME 10" x 48" Magnetic Chuck* for each machine.

Production	200 pieces per hour
Cost	$0.00812 each
Rejects	None
Total Scrap	0.2 of 1%

*PAID FOR BOTH CHUCKS IN 57 WORKING DAYS



Cross-section of chuck showing recessed top plate with work piece in position.

C. J. Beard, Methods Engineer, Remington Rand, Elmira, New York, says:
"We are so well satisfied with the results of this set-up that we are in the process of tooling-up new parts, using MAGNA-LOCK Magnetic Chucks."

Write for complete details . . . Dept. MM-110

HANCHETT Magna-Lock CORPORATION

Magnetic Chucks and Devices

BIG RAPIDS • MICHIGAN • U. S. A.

Table I

Hourly Charge	Old Machine	New Machine
Labor (wages paid)	$1.50	$1.50
Labor—fringe benefits	.35	.35
Overhead (indirect labor)	2.00	2.00
Charge for depreciation	.50	1.00
Total	$4.35	$4.85

By determining the next year's cost for both the old and the new machine, a dollar and cents comparison between the two can be made. If the new machine saves a substantial sum relative to its cost, the desirability of replacement becomes evident. Only an analysis, however, will show the relative merits of the two machines. It is not too difficult to make factual comparisons, rather than to depend on off-hand appraisals that may be erroneous. With facts in hand, management can honestly judge the relative merits of a new machine and render a sound decision. There are practical limitations for any equipment budget that need to be considered, which cannot be minimized. Nevertheless, it is much easier to get the most from these limitations when concrete information is availble.

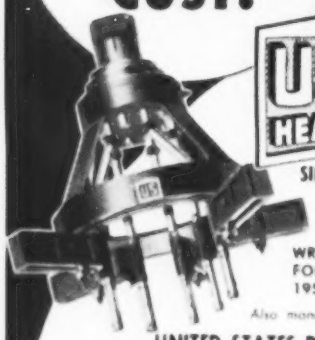
Effect of Depreciation Charges

Sometimes the magnitude of the original investment clouds the picture as to what the hourly cost will be for the new machine. The increase in hourly charge for depreciation is apt to be the smallest component. For example, assume that the old machine, originally costing $10,000, is being depreciated on a 10-year period, and a new machine, costing $20,000, is being considered as a replacement. The important hourly charges can be listed as shown in Table I.

Figure the HOLE Cost!

ADJUSTABLE MULTIPLE DRILL HEADS

Fit any machine, 2 to 10 Spindles. Save 2 to 10 Operations



US HEADS SINCE 1915

PRICES: 6" DRILLING AREA
1/4 capacity, 21/32 center

U-1	3 Spindle Head,	$190.00	U-1	6 Spindle Head,	$215.00
	4 " "	198.00		7 " "	228.00
	5 " "	203.00		8 " "	254.00

PRICES: 10" DRILLING AREA
1/2 capacity in cast iron standard
3/4 special adaption in cast iron

U-2	3 Spindle Head,	$246.00	U-2	7 Spindle Head,	$383.00
	4 " "	280.00		8 " "	418.00
	5 " "	315.00		9 " "	453.00
	6 " "	349.00		10 " "	487.00

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Also manufacturer of all types of fixed center and individual lead screw tapping heads.

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PORTER-CABLE

ABRASIVE BELT MACHINING

Production
More than Doubled!



The Problem—To remove tool marks—present a fine finish for anodizing—produce two radii for a forged aluminum gun mount (tensile strength 50,000 lbs.)

Previous Method—Hand filing removed tool marks—hand polish attained required fine finish—hand filing produced two radii.

Solution—Using Porter-Cable WG-4 Abrasive Belt Grinder (illus. above), all tool marks were removed—With the use of calibrated angle table, two radii were ground—Polishing accomplished without distortion or loss of flat precision surfaces.

Results—From 30 to 45 seconds required to finish each piece—PRODUCTION MORE THAN DOUBLED—labor cost reduced. The finish obtained on this gun mount with one operation is suitable for anodizing without further operations. No setup time required to grind two radii.

The Porter-Cable machine that made this speed and economy record, Model WG-4, is outstanding for production runs on small parts, fed freehand or by simple fixtures. Gives final finish to jobs done on automatics, band and hacksaws, lathes, milling machines, etc. With ability to grind carbide tipped tools, it's handy for toolrooms, too.

For free 8 page folder, "Abrasive-Belt Finishing," send in coupon at right.

CONTOUR GRINDER

Model C-6. For curved or flat-face grinding or polishing. Mounting of shaped contact roll gives easy adjustments for varied work.

AUTOMATIC FEED

Model BG-8 (with automatic feed table). A precision surfacing machine for repeat operations, without expensive fixtures. 8" wide belt.

PLATEN OR FREE BELT

Model B-6W. Platens of various shape form flexible abrasive belt to curved or irregular surfaces. Inaccessible spots are ground by free belt.

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Based on the data used, the increase in hourly charge due to depreciating a $20,000 investment against a $10,000 one is about 11.5 per cent. Since labor costs and fringe benefits will not change materially and in many cases overhead charges or burden will not be greatly altered, the effect of increasing the investment in a machine from the depreciation aspect is not very great. The question of whether or not an hourly charge is large or small depends on the hourly production. There are many instances today where it is easily possible to so increase hourly production that an increase in hourly cost can be more than offset by increased productivity.

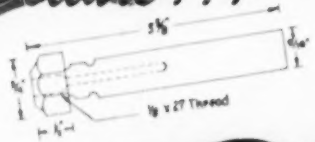
Graphic Solution for Replacement Studies

Another way to analyze costs is to plot the data in the form of a break-even chart. As indicated on the chart, Fig. 1, the break-even point shows where savings from the new machine start to materialize. The closer that this crossover point is to 0 capacity or production, the more easily can one justify the merit of the new method or machine.

The graph indicates higher fixed charges for the new equipment, which is particularly true in most present-day cases. It is the increased production capacity of new equipment purchase.

The break-even point as a per

How to trade *Pennies* for *Dollars* . . .



10¢ more (per gallon) invested in cutting fluids SAVES $50 PER DAY PER MACHINE!

PRICE alone makes no profit. The drawing above illustrates a shackle bolt which is drilled and tapped on a New Britain Automatic. Using an inferior cutting oil 12 taps were used up every 2½ days—12 pieces per tap. A change to Stuart's SPEEDKUT M on a 2½ day run showed 530 pieces per tap—no taps used up. The saving? Taking into full account the pennies—higher price of Stuart *quality* oil: $50 per day per machine!

If you are interested in a saving like this, ask to have a Stuart representative call. There is no obligation — we'll let Stuart performance do the selling.

D.A. Stuart Oil CO.

2741-47 S. Troy Street, Chicago 23, Illinois



Prescription for

UNBALANCED *Steel Bar and Shafting* INVENTORY

Discontinue own stockpiling—Secure copy of Union Drawn Distributor's *stocklist*—Draw regularly on his ample, fully diversified steel bar and shafting stock—for your current production needs ONLY (a bar at a time or a truckload)—Immediate response—Delivery within hours of your request.

INSTANT RELIEF from... inventory troubles ... down-time due to shortages ... low productivity ... paralyzed capital (frozen in overhead and stock)... sluggish profits.

N.B.—Phone for STOCKLIST today!

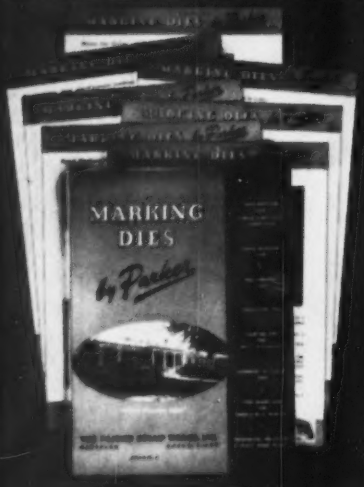
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WRITE TODAY

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CRAFTSMEN SINCE 1871

cent of capacity helps one realize how effectively he can count on making the savings indicated, based on overall business conditions.

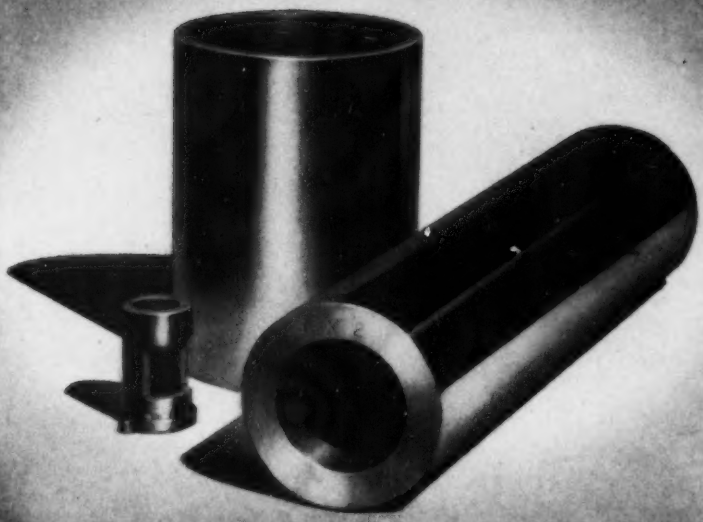
Summary

Obsolete and inadequate equipment is a profit leak that does not show up directly on a balance sheet. Like a small crack in a dam, the first effect is negligible. When the crack becomes wider, it may cause considerable damage and force costly repairs. Just as progressive maintenance policies call for frequent check-ups, the protection of the capital assets in the form of equipment calls for a continuous re-appraisal policy. The protection of the interests of the stockholders, employees, and the customers means that management must take advantage of opportunities to improve the productivity level of its organization. Producing better goods at lower cost is a worthy objective. One of the key ingredients is a sound replacement policy, carefully administered and continuously practiced.



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BRONZE SPECIALISTS SINCE 1900



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FULLY MACHINED BARS

SPECIAL BEARINGS

Producing millions of standard and special bronze bearings for thousands of power transmission applications has taught us a lot about bronze, the ideal bearing metal. Our specialized service to America's industries for nearly a half century, enables us to offer highest quality bearing bronze at a cost made possible only by latest production methods. Do you have a special bearing problem? The Buckeye Brass and Manufacturing Company, 5410 Hawthorne Avenue, Cleveland 3, Ohio.

BEARING BRONZE



View of Navy Fleet repair ship which contains some 30 special and technical shops manned with navy-trained specialists and technicians.

Mister Fixits of the Fleet

By E. H. Baer

ONE of the Mister Fixits of the United States Navy Pacific Fleet dropped anchor at the Naval Supply Center, Oakland, recently to take on stores, supplies and added equipment for service to the ships at sea. A Mister Fixit is a 16,000 ton repair ship, with something like 30 different shops equipped with the most modern machinery and manned by 700 Navy-trained experts, officers and men. The floating maintenance and repair base is 522 feet long.

The crew is made up of specialists and technicians capable of electronics, optical, refrigeration, heavy machine, ordnance and other precision repair



Lt. Robert Hopkins, Operations Officer, Detroit, Michigan (left), watches C. A. Mincey, IC3c, Winnsboro, S. C., replace an azimuth meter in master gyroscope aboard U. S. Navy Fleet repair ship.

and maintenance required by the Fleet. Shipfitters, sheet metal workers, pattern makers, gyro electrical technicians, metal smiths, pipefitters, printers, photographers, carpenters, watch makers, motor experts and technical instrument men perform duty aboard the repair vessel, or go in teams to ships needing maintenance or repair.

Results of the vast and highly organized Navy school system's education and training of the young men who man the Mister Fixits are portrayed successfuly on these ships. Several of the shops are air conditioned, for example, the fire control shop which repairs gun sights and control equipment, as well as the gyroscope shop which repairs and calibrates gyro compasses for all ships serviced. The electronic repair shop is air conditioned to keep out dust and other impurities in the air.

A Mister Fixit has everything but a drydock. The ship is equipped for the fabrication of parts in the ship's foundry and in the main machine shop. Spare parts of all needed kinds are carried in stock. And in addition to conducting repair operations the ship is a warehouse and huge supply store doing wholesale and retail business with the fleet.

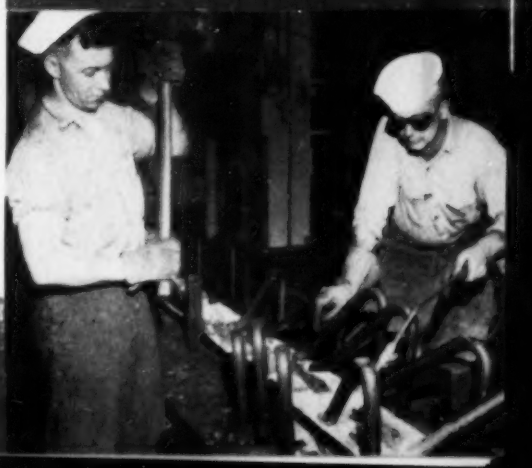
Four photographers and laboratory assistants keep records of damaged, faulty or repaired parts. One interesting fact is that the ship maintains a "special sea watch" with a photographer on duty at all times whenever the ship enters or leaves a port. World War II in the Pacific established history in sea warfare with huge floating drydocks, repair ships, supply ships and oilers, refueling the fighting ships at sea. The Mister Fixits are one of the most important units of the United States Navy.



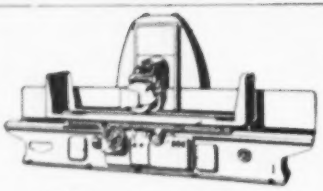
Thomas Covington, MM3c, Long Beach, California (left), sclicrottes a chain while [illegible] Woods, MM3c, 937 29th Street, Oakland, California, operates a "boring mill" in general machine shop aboard Navy Fleet repair ship.



R. A. Williams, MM2c, Denver, Colorado, [illegible] galley vent while Chief Petty Officer and sheet metal expert H. S. Constance, Spring Valley, California, polishes a sheet metal chop aboard a large Navy Fleet repair ship.



S. V. Dozier, Metalsmith 3c, 1724 Jackson Street, Long Beach, California (left), aids William Kozyk, MC2c, 416 Berkeley Square, Richmond, Florida, straighten "eye beam" in foundry aboard Navy repair ship.



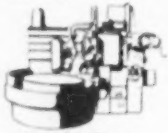
Precision Surface Grinders
Horizontal Spindle



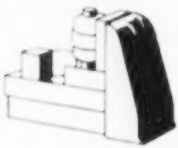
Disc Grinders,
Double Spindle Type



Vertical Spindle
Disc Grinders



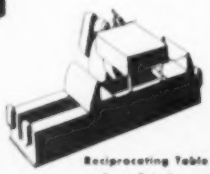
Plano Grinders,
Rotary Table Type



Rotary Table
Surface Grinders



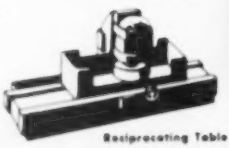
Automatic Rotary
Surface Grinders



Reciprocating Table
Face Grinders



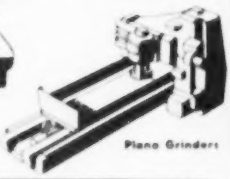
Disc Grinders,
Single Spindle Type



Reciprocating Table
Surface Grinders
Vertical Spindle



Face Grinders,
Traveling Wheel



Plano Grinders

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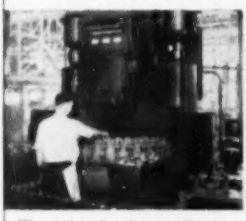
For catalog on all machines, ask for free copy of general bulletin.



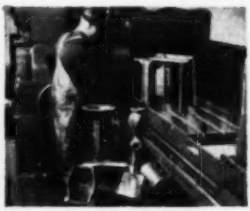
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120 surfaces of cast iron compression heads per hour, removing 1 1/2" stock with Mattison No. 26 Rotary Surface Grinder



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Shows variety of work run on Mattison Face Grinders

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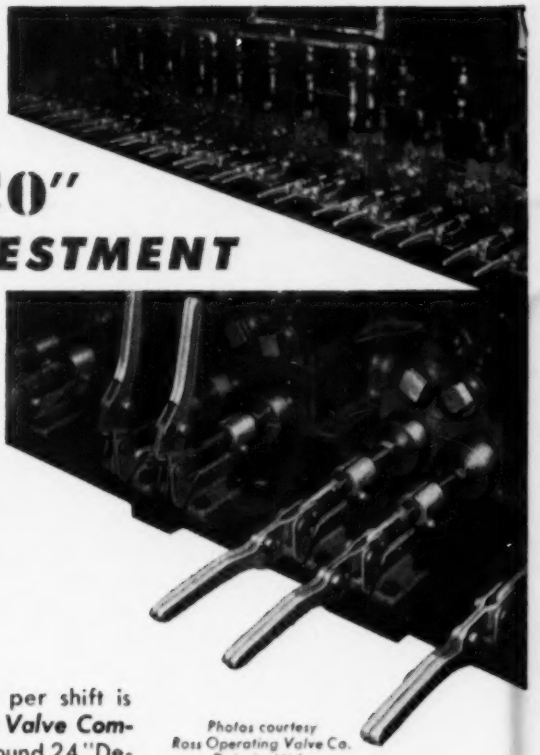
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$5000

each shift per year



Photos courtesy Ross Operating Valve Co. Detroit, Mich.

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Warpage Avoided in Carbonizing Gears

Holes remain straight within close tolerances even though parts are quenched with axes vertical after heating the 5145 steel 75 minutes at 1,530 deg. F. in a controlled atmosphere furnace.

By Herbert Chase

PLANET pinions and other types of helical gears are among the precision parts for Powerglide transmissions which are made and heat-treated in the new Chevrolet plant at Cleveland, Ohio. Such gears are produced from S. A. E. 5145 steel and are carbonitrided in two batch-type controlled atmosphere furnaces equipped with recirculating fans. The loading side of one such furnace is shown in the accompanying illustration.

Gears are set five tiers high on screens in boxes, finger distance apart and with axes vertical. Each of the furnaces holds four boxes, and the total load of gears per charge weighs 350 to 400 lb. Loading is effected through a vestibule that is purged of air before the charge is shifted into the furnace. The controlled atmosphere contains 0.1 to 0.2 per CO_2, the balance being CO, H, and N with additions of 700 cubic feet an hour of carrier gas and 25 to 30 cubic feet an hour of ammonia.

Gears remain in the furnace for 75 minutes and soon attain a temperature of 1,530 deg. F. Upon withdrawal into the vestibule, the charge is lowered into a tank holding 1,900 gallons of 70 seconds at 100 degrees mineral quench oil which is inexpensive but quite satisfactory for the purpose. This oil is held at about 125 deg. F. and its temperature is not allowed to vary more than 5 degrees. Oil at 125 deg. F. enters the tank through a four-pipe mainfold at the bottom, the pipes having numerous holes so that the incoming oil is well distributed in addition to being rapidly circulated through the tank and the heat exchanger.

Planet pinions measure 1 $\frac{5}{16}$ inches in diameter, have a hole of $\frac{1}{2}$-inch inside diameter, and are 1$\frac{5}{8}$ inches long, the hole being honed before heat treating and held straight and to size within 0.0004 inch. Quenching is done with gear axes vertical so that an austenitic and martensitic structure is obtained, resulting in a substantially straight hole. If with a less carefully controlled quench the martensitic structure only is obtained, the hole closes in about 0.0025 inch at the bottom, 0.0005 inch



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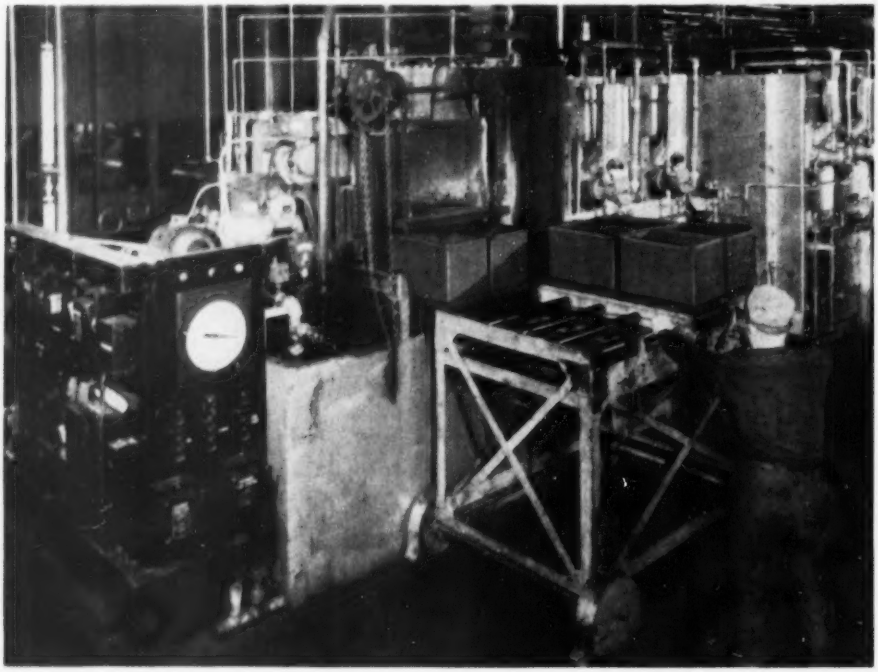
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half way through and 0.0015 inch at the top. This distorted hole would then cause considerable difficulty in subsequent honing to final size.

Some pinions heat treated are termed "short" because the toothed section, $1\frac{1}{4}$ inches outside diameter, extends for only half of the $1\frac{5}{8}$-inch length, the remainder being a hub having an outside diameter of only $1\frac{1}{8}$ inches. The hole is $\frac{1}{2}$ inch inside diameter, as on the long pinions. Initially, with this shape, the wall at the tooth end was thicker than at the hub end and quenching caused a somewhat tapered hole having its largest diameter at the thicker tooth end.

This trouble has been avoided by cutting an annular recess $\frac{1}{8}$ inch deep and $\frac{1}{8}$ inch wide in the face at the large diameter end of the gear, the recesses being about half way between the hole and the large outside diameter. With this recess, section thickness becomes about the same at both ends, and the hole is not tapered more than 0.0005 inch after quenching. A taper of 0.0005 inch or less allows for comparatively easy finish honing and is acceptable; any amount of taper over this figure is undesirable. The heat treatment in this case is the same as for other pinions without a stepped diameter, and a similar austenitic and martensitic structure results.



Loading boxes of pinions for Chevrolet Powerglide transmission into the vestibule of a carbonitriding furnace. After a 75-minute heat treatment in the controlled atmosphere, pinions are rapidly quenched in a tank located below the furnace vestibule.



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Management's Stake in the Welfare Issue (Production Series No. 192). Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 24 pages. Paper covers. Price, 50 cents.

Comprising this booklet are papers which were presented at the Spring Production Conference of A.M.A. held at the Hotel Statler in New York City. Included is a panel session entitled "The Impact of Pensions on Factors of Production" which was presided over by David L. Cole, Cole, Morrill & Nadell, Paterson, N. J., with a panel consisting of William G. Caples, manager of industrial relations, Inland Steel Co., Chicago; Carroll E. French, director of industrial relations division, National Association of Manufacturers, New York; Leonard Lesser, counsel, Social Security Department, United Auto Workers (C.I.O.), Detroit; and Nelson H. Cruikshank, director, social insurance activities, American Federation of Labor, Washington. In addition, the booklet contains a paper entitled "The Social Responsibility of Business" by Walter H. Wheeler, Jr., president, Pitney-Bowes, Inc., Stamford, Connecticut.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



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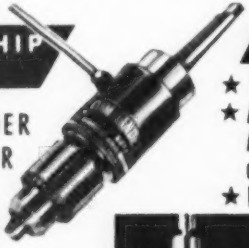


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Cast Iron machining dust giving you trouble?

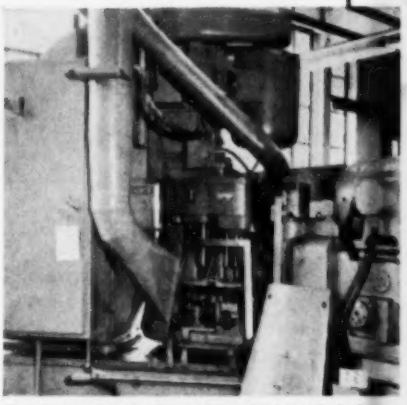
IF SO YOU'VE GOT A JOB FOR ROTO-CLONE DUST CONTROL

CAST iron dust has long presented a collection problem. Now, with increased machine tool speeds and the tendency to concentrate a greater number of operations in a given area, there is an ever-increasing demand for a practical solution.

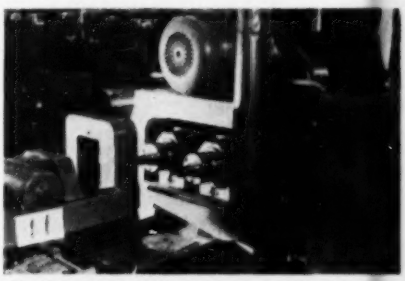
And here's the answer. Scores of companies are using Type D Roto-Clones* successfully to exhaust and collect fine, floating cast iron dust from their machining operations. Whether it's drilling, reaming, boring, milling, turning or gear cutting, you are assured of positive dust control.

The Type D Roto-Clone is the most widely used dust collector in industry today. Its advantages are many—constant efficiency under all operating conditions, uniform air volume, small space requirements and ease of installation. When desired, a Cycoil Oil Bath After-Cleaner can be added which will provide the necessary cleanliness to permit recirculation of the cleaned air to the workroom.

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ROTO-CLONE
DUST CONTROL EQUIPMENT

Mass Production of Indicator Lights

In which the author discusses methods and equipment employed in the highly specialized manufacture of the small varied-colored lights used in aircraft.

By Howard E. Jackson

THE Korry Manufacturing Company of Seattle, Washington, is engaged in the highly specialized business of mass-producing small, varied-colored airplane indicator lights of the type shown in Fig. 1. These "Korry-lites" as they are called are less than two inches long and are constructed of parts which are made to close tolerances so as to eliminate any leakage of light that might "blind" the pilot.

Boris V. Korry, who was an engineer at Boeing Airplane Company for many years, started working on his "lite" in 1938 while he was still with the airplane company. Two years later he left Boeing to devote full time to this highly specialized production and, during the war, his newly-formed company built indicator lights for B-17's, B-29's, and other types of aircraft.

Today, practically every commercial airline in this country, including P.A.A., Northwest, Delta, United, and others, as well as many airlines in foreign countries, use planes equipped with these indicator lights. One airline uses three different makes of airplanes but requests the use of "Korry-lites" since they are versatile and interchangeable. The major airplane-producing companies which use these lights include Beech, Boeing, Consolidated Vultee, Douglas, Lockheed, Martin, and Curtiss-Wright.

There are four types of lights; namely, a standard single bulb light, a dual light with two bulbs, a press-to-

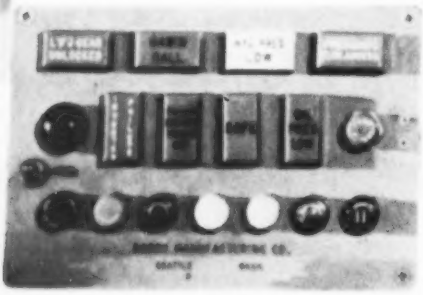


Fig. 1—Demonstration panel displaying indicator lights produced by Korry Manufacturing Company.

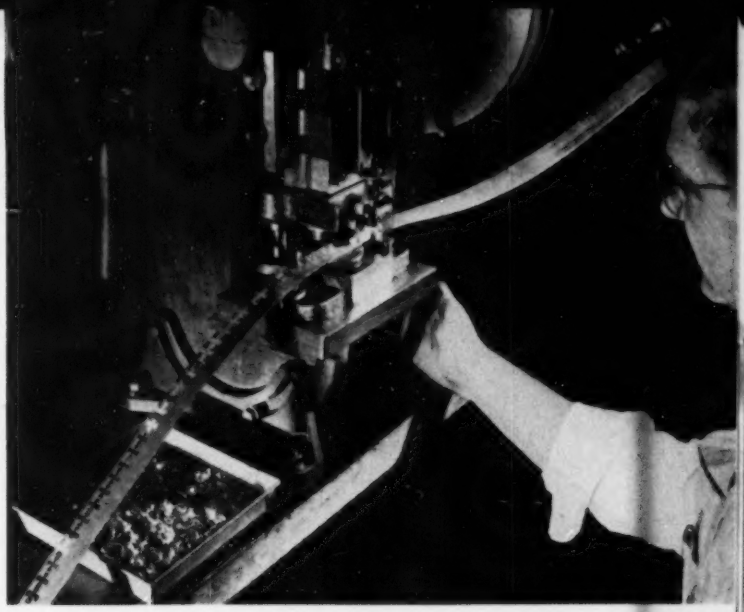


Fig. 2—Mass production of indicator lights is accomplished by use of punch presses. The press shown blanks out shutters used for adjusting the amount of light given off by "Korry-lites."

test light which tests out the filament, and a new flush type lamp which fits flush with any surface so that pilots or passengers cannot be injured if they bump it or are thrown against it. There are as many as 30 variations of engravings on the plastic indicator light caps in an airplane, such as "Door Open," "Safe," and "Hyd. Press. Low" or "Oil Press. Low." The caps are made in various colors. The engraved lights are most prominently found on instrument panels.

Most of the 52 component parts of each indicator light are made in presses and allied equipment. Most of the parts are less than one inch long. One small bench press blanks out the shutters for the caps, as shown in Fig. 2. These shutters are used for adjusting the amount of light by overlapping two shutters in a cap. This same press also cuts the phosphorous bronze friction spring used in each light to ⅛ inch in width. One-inch strips of this material are sheared into strips in an "outside" factory. The spring has just enough friction to offset vibration



Fig. 3 — Small kick presses are used for assembling indicator lights. This illustration shows the plastic cap for a light being placed over the shutter which, in turn, has been placed on the sleeve.



Fig. 4—An engraver is used for lettering the caps of indicator lights. The "Fwd. Cargo" cap being engraved will be used on a dual lamp.

made parts. Practically all of the material used is aluminum alloy, with the bulk of it in ST condition; however, some of it is in SO condition. Two types of terminals are blanked and formed in this press. One type is blanked and formed in two operations, and and the other type is just blanked. Reflectors for the lights are punched and cut out on the same press. The sleeve for the light cap is cut on an automatic screw machine.

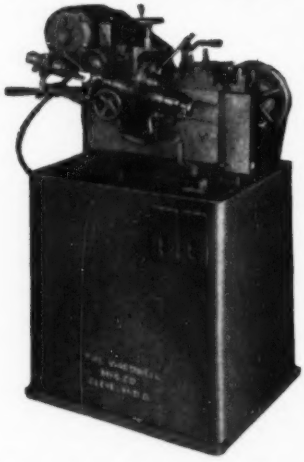
which might cause the cap to work open and allow unwanted light to streak out. A larger punch press is used for making most of the punch-

Sharpens Saws in gangs

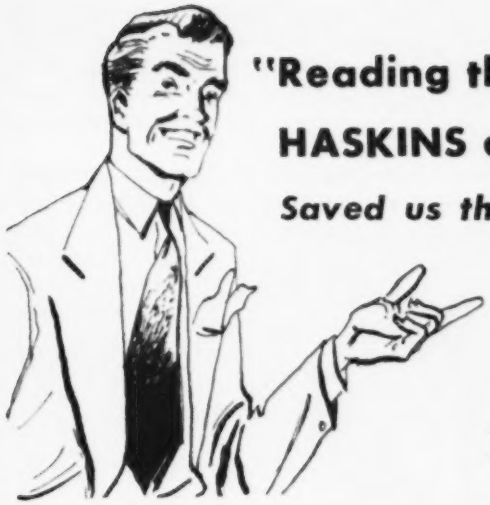
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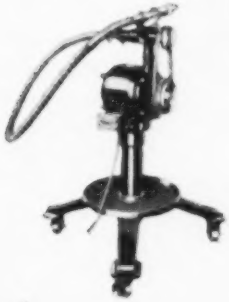
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Five small kick presses of the type shown in Fig. 3 are used for secondary punching work and for assembly operations. The slot which limits the travel of the light cap from out to full positioned is punched out on one of the kick presses. Here, too, the work must be exact. An engraver is used for lettering the caps, as shown in Fig. 4. Letters can be of any size, although most of them are relatively small.

The nuts which hold the lights on the instrument panels are blanked out on a punch press and then threaded on a drill press equipped with a special tapping attachment. Nearly a dozen other drill presses are used for various operations, in addition to a carbide tool grinder with a diamond wheel which is employed for certain jobs.

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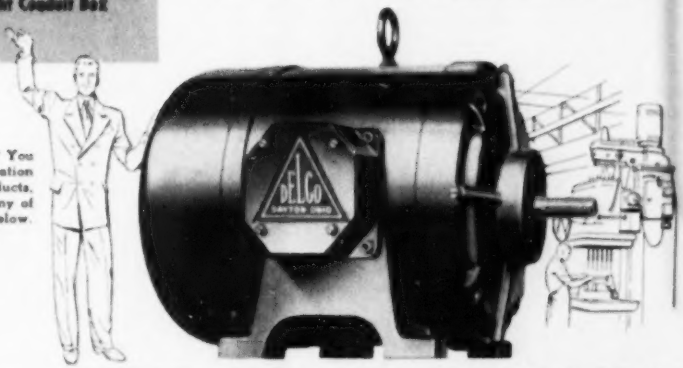
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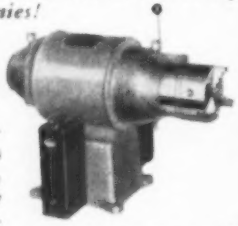
SPEED LATHES



Who Uses Them?

General Electric • Aluminum Co. of America • Studebaker • Thos. A. Edison • Ford Motor • Westinghouse Electric • Owens Illinois Glass • Lockheed Aircraft • Western Gear Works • Bryant Electric • Royal Typewriter • Yale & Towne • Eastern Airlines • Minneapolis Honeywell • Remington Arms • • American Locomotive • American Brass . . . *and several hundred more top drawer companies!*

Why?



Because Schauer Speed Lathes *cut from 30% to 90% off the cost of polishing, filing, lapping or de-burring small metal and plastic parts!*



- Chuck, collet or vacuum holding fixtures.
- Single speed, two-speed or variable speed models.
- SAVE WITH SCHAUER! Write for Bulletin 490.

SCHAUER MANUFACTURING CORP.

• ORIGINATORS OF TODAY'S SPEED LATHES

2060 Reading Road **Cincinnati 2, Ohio**

Whenever possible long runs are made in the mass production of these indicator lights. Close tolerances must be maintained in all operations in order to save time and facilitate assembly. Because of the highly specialized nature of the work, all tool and die work is done in the company's own shop, which is fully equipped with screw machines, lathes, engine lathes, milling machines, a grinder and shaper.

Some concerns are now using these indicator lights for non-airplane applications. For example, J. A. Maurer, Inc., of New York City, which specializes in motion picture equipment, uses the lights in film recording equipment and on power supply units. During the war, Western Electric Company used the lights on radar equipment, and the United States Government used them on component equipment in submarines, as well as warplanes. Orders for these lights are now received from all over the world.



"I've got a dandy wire to show him when he comes in!"

CARD
Machine Screw
TAPS



Cost No More ... Assure Standardized Accuracy

Card's extreme care in maintaining utmost accuracy is a *plus* that lifts Card Certified* Taps away above the ordinary. Costing no more than run-of-the-mill taps, they're your best possible buy for dependability and long, economical use.

Card Machine Screw Taps are available in both carbon steel cut thread and high speed steel cut thread or ground thread.

Your nearby Card Distributor will be glad to supply you with these accurate, top quality taps — and to cooperate with you in every way. Contact him for prompt, helpful service.



TAPS
The Certified Cutting Tools*
*By the Pittsburgh Testing Laboratory
Also makers of DIES · SCREW PLATES
DIE STOCKS · TAP WRENCHES

S. W. CARD
MANUFACTURING CO.
Mansfield, Massachusetts
DIVISION OF UNION TWIST DRILL COMPANY

for FLOOR STANDS



for SWING FRAMES



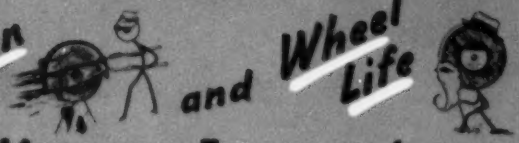
for PORTABLES



Making better products to make other products better

Wouldn't You Like a Wheel with *the* Combination of

Cutting Action and *Wheel Life*



that means *MAXIMUM ECONOMY* for you on each of your Rough Grinding Jobs?

NO matter what combination of cutting action and length of wheel life you require for maximum economy on your particular snagging jobs, Norton Company, with its research facilities, engineering skill and wide product variety, can fill your requirements.

FAST CUT

If "fast cut" is the primary requirement which spells economy on your snagging operations, you'll find a Norton wheel with exactly the right abrasive and bond combination to fill the bill.

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If "long life" is your particular requirement for economy, Norton abrasive know-how can help you to select exactly the right grinding wheels.

PRODUCT VARIETY

Norton wheels for snagging operations are available with ALUNDUM, 15 ALUNDUM, 57 ALUNDUM and CRYSTOLON abrasives; with B-5, B-7 and BH resinoid bonds and vitrified bond.



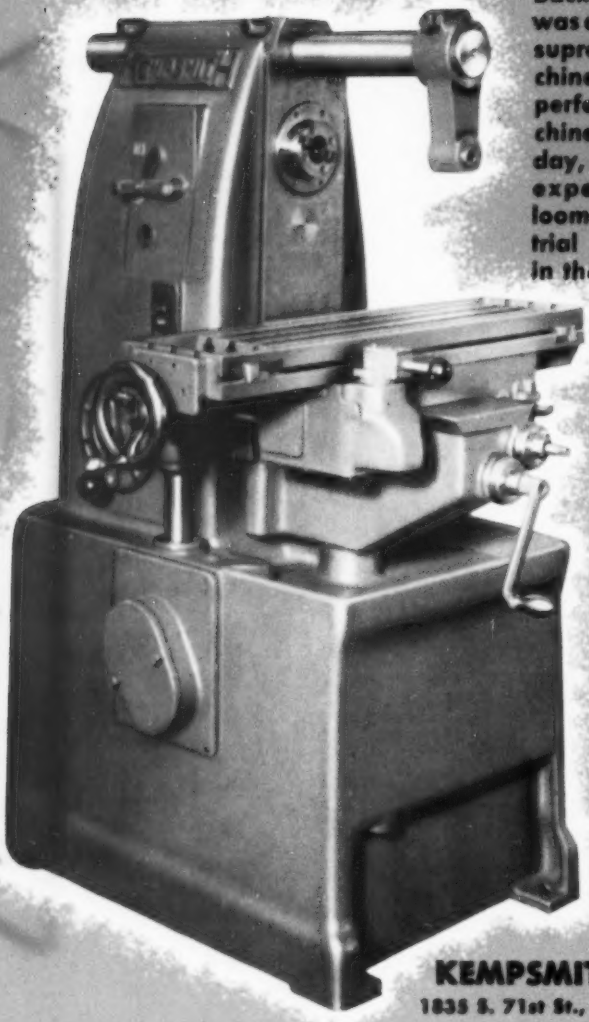
For helpful tips on rough grinding and cost-cutting wheel specifications, send for your copy of Form 1405 J



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Meeting the Needs of Industry for More than 60 YEARS!



Back in 1888, Kempsmith was a byword for America's supremacy in milling machines . . . pioneering and perfecting many new machines vital to industry. Today, Kempsmith's matured experience continues to loom soundly on the industrial horizon. You see it in the —

New

KEMPSMITH LH MILLER

— a rugged, yet lightweight milling machine, designed by Kempsmith Engineers for the many "in between" milling jobs. It bridges the gap between low range hand millers and big, expensive machines . . . combines sound, rigid construction with flexibility and versatility. It's ideal for small end milling, high speed jig boring, keyswaying, oil grooving, light straddle milling, etc. Ask for Bulletin No. 127.

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1835 S. 71st St., Milwaukee 14, Wis., U.S.A.

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the "holes in our heads" are full

. . . OF COST-CUTTING IDEAS

Yes, the "holes" in our engineers' heads are full of ideas to give you newer, faster, lower cost methods of boring . . . methods that save you time and money. If your job needs a special bar or special cutter, we'll design and make it. Chances are a standard Madison cutter in the right Madison bar will give you greater production economy. The Madison line, built over a period of thirty-five years, is broad enough to fit nearly any boring requirement. Let Madison's experienced boring specialists . . . the "men with holes in their heads" . . . help you cut your boring costs. Submit your problems for recommendations by our problem solving tool design department. Of course there's no obligation.



Write for the information filled Madison Catalog. It is yours for the asking.

MADISON MANUFACTURING COMPANY
DEPT. MM MUSKEGON, MICHIGAN

Helpful Hints On Selling To The Government

An address delivered by the author at Machine Tool Sales Conference, Cornell, University

By E. J. Siefreat

President, Siefreat-Elstad Machinery Company

IN the booklet entitled "Selling To The Government," the Washington office of the United States Chamber of Commerce provides unmistakably clear and concise answers to many of the perplexing problems which confront the manufacturer who desires to bid on government work. The booklet is basic in scope. It contains fundamental and factual information under separate section headings such as: "Who buys for the Government," "Where to get the facts," "What to do," and so on. As an information-type booklet, it is of necessity brief and while it can be used as an excellent guide, those who intend to make use of it might well profit by the suggestions offered herewith.

Perhaps the most important bit of advice we could offer is to suggest that you get your name on the "bidders" list. A great deal of valuable preliminary work can be lost because of failure to have your name on this bidders list. Each government buying agency has a bidders list. Briefly, you must explain what it is that you wish to offer. It is well to tell of your past dealings with the Government, and also tell of other products that you manufacture. Very often it is worthwhile to give information regarding your plant. In order to establish yourself as a responsible bidder, it is usually necessary to provide a financial statement to the proper department. It is important, in the machine tool business, to get on the bidders list, but there is other important and more difficult work to be done. When an invitation to bid is received, either bid or decline to bid.

In declining to bid, state your reason for not bidding. If you have been asked to bid on an item which you do not produce or is remote from your products, explain this fact in a letter and give the department a chance to correct their records. Do not throw your invitation in a wastebasket if you do not intend to bid. You may find that

a continued discarding of bids into the wastebasket will result in your name being removed from the bidders list and you may miss the invitation you really want.

Preparation of the bid is extremely important. If your bid is accepted, you have made a contract to supply the required items at the price you indicate and on the specified terms. Do not forget this point.

Again be sure that you want to bid. There are risks. It is well not to anticipate receiving contracts. Many a firm has expanded its facilities based on anticipation of contracts and found that the contract did not materialize. Even after receiving a contract, there is no assurance that you will get a second contract, because the second contract will be subject to bidding.

There is a great deal of work involved in the preparation of a bid if the bid is to be properly prepared, and all this work takes time and money, therefore each bid preparation is expensive.

Each invitation to bid tells the bidder to read the invitation carefully. This is often the major pitfall in bidding. Careless reading of invitations, or misunderstanding the invitation, can lead to very serious and expensive mistakes. This applies to whatever item you are offering to the Government.

In preparing the price, every item of cost should be included. There are many apparently innocent requirements in a bid which may be expensive. In the main, the machine tools which are sold to the Government are standard price listed items, but even concerning these items there are often requirements, such as special data, special painting, special packaging and marking, all of which are expensive.

Mistakes in bidding are often made in stating the quantity. This type

---

THE accompanying illustration shows a 100 h.p. motor designed for use with a Mattison No. 400S vertical spindle surface grinder recently completed by the Mattison Machine Works, Rockfor, Ill., and now in operation in one of the automotive plants engaged in reconditioning large size dies. Believed to be the largest motor ever to be used in connection with a grinder of this type, the 100 h.p. motor provides for quick stock removal.



of error does not occur very often when dealing with machine tools, but there can be mistakes made in handling the question of price and quantity.

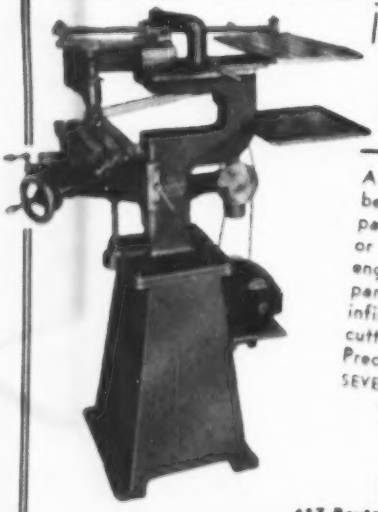
Study the restrictions that apply to Government contracts. There are many restrictions, many of which can provide for higher costs.

Government contracts often include Penalty Clauses for delivery. This situation must be handled very carefully, or the penalty can be applied. A distributor has no right to accept a penalty contract without the consent of the builder. A machine tool builder must watch the penalty clause most carefully, or he may wind up with a severe penalty.

Bids must be prepared promptly in order to reach the purchasing office before the hour announced for opening of the bids. Late bids will not be accepted. There is an increased use of metered mailing devices. It is not advisable to use metered mailing devices on Government bids. The metered markings do not go through the Post Office cancelling machine. If stamps are used, your bid will go through the cancelling machine, and if the bid was mailed in time to have been read at the opening hour which has been specified, the bid will be considered. Bids may be withdrawn prior to bid opening but not after the appointed hour for opening.

All bids are opened publicly at the scheduled hour and announced place. Anyone may attend the bid openings. The bids are read aloud in the presence of bidders, and the bids are recorded. This will be your first opportunity to see how your bid compares on a competitive basis.

Awards must be made to the lowest responsible bidder whose bid is respon-



NEW MODEL 2D-4
PANTO-ENGRAVER

A precision two-dimensional engraving machine, bench or floor model for large metal or plastic panels, signs and name plates; steel stamps and dies or any product requiring production or precision engraving. Will engrave to center of 30 inch wide panels. Pantograph reductions from 1:1 ratio to infinity. Collet capacity 1/10" to 1/4" diameter. Six cutter spindle speeds from 5,000 to 14,000 R.P.M. Precision ball bearings throughout.

SEVERAL OTHER MODELS AVAILABLE FOR ENGRAVING, ACID ETCHING AND ELECTRICAL MARKING.

Write for Illustrated Literature Today

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657 Route 29 Hillside 5, N. J.

MARKING PANTO EQUIPMENT

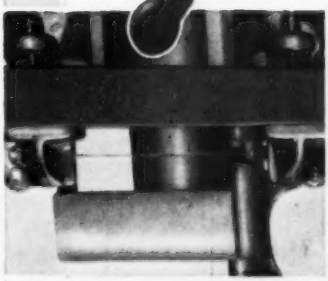
SEE WHAT YOU'RE DOING!

Kalamazoo



KALAMAZOO
MODELS —
816-S — 824-S
(COOLANT
EQUIPMENT
AVAILABLE)

METAL CUTTING BAND SAW



Only Kalamazoo gives an unobstructed view of cut-off operations! The operator looks directly down into the cut . . . sees for himself how work is progressing, gets instant warning if blade adjustment is needed.

Full work view is one of many exclusive Kalamazoo features giving you faster, smoother, more accurate cutting of angle iron, tubes, bars, pipe. Handles 95% of normal cut-off operations. Leaves no burr, minimum kerf.

Sturdy, rugged, and portable. Has 4 Timken bearings. Blades can be changed in 30 seconds.

Write today for full details on lower-cost metal cutting . . . the Kalamazoo way.

MACHINE TOOL DIV. *Kalamazoo* TANK and SILO CO.

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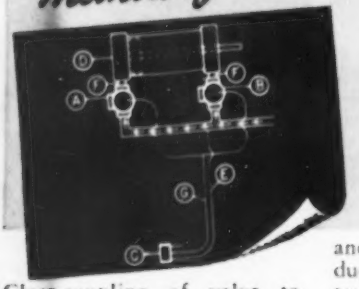
sive to the invitation for bid. There is also another condition—that the bid be the most advantageous to the Government, price and other factors considered. This does not always mean that the lowest bid will secure the award. A responsible bidder is one who is financially, and othewise, able to perform the contract. A responsive bid:

1. Meets the requirements of the invitation;
2. Offers to provide the supplies needed in accordance with the specifications and delivery schedule set forth in the invitation; and
3. Contains no restrictions or qualifications beyond those permitted in the invitation.

The successful bidder must furnish what he agreed to furnish if he expects to be paid.

Contract awards and performance are checked by offices within each agency or service. The final authority in the checking of contracts is the Comptroller General, who has charge of the General Accounting Office and reports only to Congress. The Comptroller General may overrule the award of a contract and perhaps decide the award was not to the lowest responsive bidder. There are provisions within the Government for the Comptroller General to take the excess payment from the contracting officer's pay and it has been done. When we understand the checking and final authority, we can see the reason

How to Boost Production with new Method of Mounting Ross Valves



★ Faster Machine Speeds
★ Less Air Consumption
★ Economical Installation
★ Easier Operation

Close-coupling of valve to cylinder! That's the story behind the remarkable success of the *new Ross In-Line Master Valve.*

Users claim several important advantages. By placing the master valves (A & B) at the cylinder (D), air supply and exhaust are speeded up appreciably. This in turn permits faster movement of the cylinder piston and materially increases production.

At the same time, the close coupling means that two lengths of large diameter piping between valve and cylinder – pipes continually filled and exhausted with non-productive air—are replaced by two short connecting pipes (F). The resultant saving in air with every movement of the piston considerably reduces operating costs.

Operation is by a small, conveniently located 3-way pilot valve (C). It is supplied through tubing (E) and connected to the master valves by tubing (G). It may be mechanically, manually or electrically controlled. Hand or foot operation is greatly facilitated by the use of the smaller, more easily actuated pilot model.

For complete details, ask for Bulletin No. 302.

ROSS OPERATING VALVE COMPANY
120 E. GOLDEN GATE AVE., DETROIT 3, MICHIGAN

Eliminate COSTLY SET-UPS!



with RIVETT'S
TRULY UNIVERSAL HYDRAULIC GRINDER

FEATURES
of a Truly Universal Grinder

1 — Internal spindles for small, large and deep hole grinding — speeds from 6,000 to 35,000 R.P.M.

2 — External spindle has double-row roller bearings for radial load and ball bearings for end thrust.

3 — Lathe-type workhead spindle mounts draw-in collets and step chucks directly.

4 — Micrometer table stop and fine feed for shoulder and blind hole grinding.

Set-up time is reduced to the barest minimum on the new 1024 Rivett with the truly universal wheelhead. Mounting both internal and external spindles and swiveling 180°, it handles both types of grinding with equal mastery — changes to either work in seconds.

Write for Bulletin No. 1024A.



RIVETT

LATHE & GRINDER, Inc.
Dept. MMSR-11, Brighton 35, Boston, Mass.

For More Precision Work RELY ON RIVETT LATHES AND GRINDERS, The Master Craftsman's Master Tools

for the elaborate records of the Government and why contracting officers are careful.

There is a seldom-used loophole in purchase regulations, and this loophole is authority for the Contracting Officer to depart from specifications, if it is in the interest of the Government. This is seldom used because it can lead to controversy. There is less difficulty for the contracting officer when a Bid invitation is cancelled and new invitations are issued.

Contracts will be awarded to a manufacturer who owns, operates, or maintains a factory, or to a regular dealer.

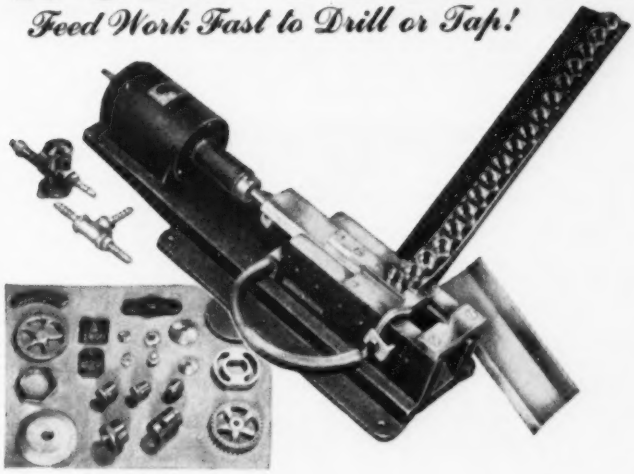
When your bid is not accepted, it is well to find out the name of the successful bidder, the amount of his bid, and then study the bid with respect to your own, so that you may be in a better position to bid in the future.

In addition to the procurement offices generally listed, there are a certain number of offices handling local procurement. Local procurement is a purchase made for a specific location and is usually small in quantity and dollar expenditure. Competitive bidding is used and machine tools are usually purchased on this basis. In general, all contracts for machine tools based on competitive bidding are not now subject to renegotiation.

There is another type of procurement—negotiated purchases which are not subject to bid openings, and the bids are by negotiation only. These negotiated purchases are subject to renegotiation. Negotiated purchases must be handled most carefully because there may be many pitfalls as a result of the bidder not understanding the conditions surrounding negotiated purchases.

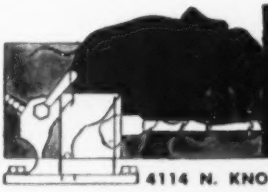
Boost Output with MEAD
WORK FEEDERS

Feed Work Fast to Drill or Tap!



As-fast-as-you-can-step-on-a-button the sensational new Mead pneumatic WORK FEEDER delivers, holds, ejects small parts to be drilled, reamed or tapped. Accommodates stampings, castings, screw machine parts, etc. Adjustable to sizes up to 3". Foot or automatic control; operator's left hand is free to keep hopper loaded.

Write for new Mead AIR POWER Catalog describing "Mead Family" of air operated fixtures and devices



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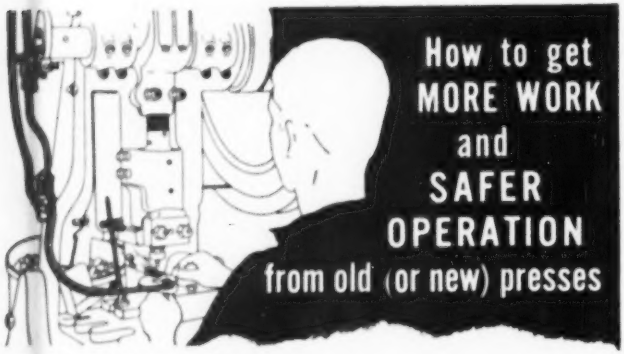
4114 N. KNOX AVE., DEPT. AA-110, CHICAGO 41, ILL.

Most Government purchases are based on Government specifications. Specifications may be Federal specifications for the use of all Government agencies, Army, Navy, Air Force, or specifications prepared by individual bureaus or offices of the Government.

It is not always possible to comply exactly to specifications, even though some Government Bid invitations carry the statement that alternate Bids will not be considered. There may be no Bid which is exactly responsive to the invitation and an alternate Bid must be considered. A Bid of this type should state frankly where it differs from specifications and why. The procedure in this case is slow because there is considerable consultation and correspondence required within the Government to justify the acceptance of an alternate Bid.

Very often the language in which an invitation to bid is couched is cryptic. You cannot be sure which of two things are meant. It is much better to quote both ways—in that case you will define carefully what you are bidding on and then carefully define what your alternate bid is and if the purchasing officer finds your alternate bid is what he really had in mind, you stand a chance of geting the order.

Another point to remember is that when a bid is cryptic, you cannot go to the contracting officer and say, "What do you mean by this sentence?". He dare not tell you, of course; he



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You can perform a few miracles by installing Schrader Air Ejection Sets on your Power Presses and other production machines—Invest a few dollars and a few hours' time then watch your production go up like a KITE.

The Schrader Air Ejection Set eliminates manual or mechanical unloading and increases output by ending time-consuming removal of work. A tremendous Air-Saving Device—operates at a minimum of air consumption. Four types to meet all requirements.

For work that is too heavy or large to be ejected by air Schrader supplies a Cylinder Ejection Set that can be timed to operate with each actuation of the machine and eject work as rapidly as the machine can be run.

Write for more information about Schrader Air Ejection Sets today. For information about hundreds of other Schrader Products-Press Controls, Air Cylinders, Valves, Air Filters, etc., write for 72-page catalog.

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measured results like these can pay off for you, too...

WHEN YOU USE BESLY TAPS

THE WORLD'S MOST ACCURATE TAP



• RESULTS—

• TAPS 60 CRANKCASES PER HOUR

High-speed, close tolerance tapping of air-cooled, industrial and marine motor crank cases is accomplished at the rate of 60 per hour using Besly Taps. 24 stud fit bottoming holes are threaded in two crankcases at a time.

• RESULTS—

• GETS 100 HOUR TAP LIFE

Average life for Besly Taps exceeds 100 hours for a midwest faucet company. Chips are cleared on a three-pitch triple lead thread—at a spindle speed of 235 r.p.m. and a reverse speed of 2150 r.p.m.

UNSURPASSED ACCURACY
at *all* vital points

- Microcentric **CHAMFER**
- Solid Ground **THREAD FORM**
- "Right" **ROCKWELL**
- Mirror Finish **FLUTES**
- Tru-Square **DRIVER**

Measured results, however good, mean nothing to you unless they're applied to your particular tapping operation. Yet, Besly's proof of performance on helping others lower tapping costs, save time and labor, turn out close tolerance work to exacting specifications, on any material, can be your guide to better tapping results.

Test Besly Taps in your own plant. Ask for a Besly trial on your job. See your Besly Distributor.

**Name on request.*

BESLY



TAPS—the world's most accurate tap.

TWIST DRILLS AND REAMERS —Complete line for every need.

TITAN ABRASIVE WHEELS AND DISCS—individually formulated for your job.

GRINDERS that reduce costs on every type of surface grinding.

CHARLES H. BESLY & COMPANY

124 N. Clinton Street • Chicago 6, Illinois
Factory: Beloit, Wisconsin

can give you no verbal supplementary information on such an invitation.

Part IV of the booklet tells "How the Government Buys" and gives details on the following subjects: Army, Navy, Air Force, Coordinated Military Procurement, Research and Development, and other procurement offices and procedures. Small business is favored because of Acts of Congress. Distressed areas also are favored because of orders from the White House.

The laws and regulations governing procurement are discussed briefly. A few of the items are:

1. Armed Service Procurement Regulations.
2. Walsh Healey Public Contracts Act governing minimum wages and working conditions.
3. Eight Hour Law of 1912.
4. Davis Bacon Act for Public Works.
5. Copeland "Anti Kickback" Act.
6. Fair Labor Standards Acts.
7. Current Appropriations Act.
8. Renegotiation Act.
9. Vinson Trammel Act limiting profits.
10. Executive orders of the President.

These are the major regulations and Acts.

It is not within the discretion of the Contracting Officer to omit these requirements from a contract. It is futile to ask a Contracting Officer for a waiver of these regulations. Our only appeal is to Congress if we do not like these requirements. If we cannot or will not comply with these various Acts, we cannot bid, because our bid cannot be accepted.

This brief summary of conditions is

Your Hardness Tester . . .



Standard "C" Diamond Cone
$18.00 F. O. B. Detroit

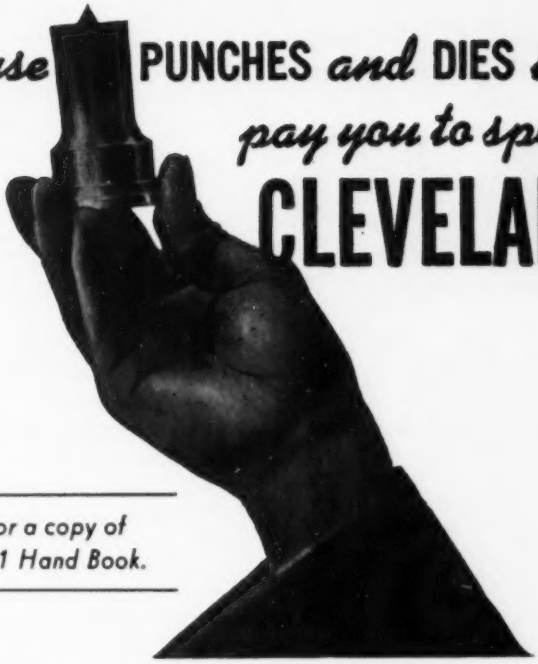
IS ONLY AS GOOD AS THE DIAMOND IT USES

Dependably accurate "Rockwell" testing results are obtained only when every part of your hardness testing equipment is made to precision limits. That is why a correctly designed diamond penetrator is of such great importance. Always specify CLARK Diamond Cone Penetrators, both for Standard and for Superficial "Rockwell" testing. They are accurately made to the proper size and shape; exactly formed by expert lappers. CLARK Penetrators are designed for use on all "Rockwell" type testing machines.

CLARK
TOMORROW'S ACCURACY TODAY
INSTRUMENT, INC.
10200 Ford Road **Dearborn, Mich.**

If you use PUNCHES *and* DIES *it will pay you to specify..*

CLEVELANDS



Write for a copy of our No. 11 Hand Book.

We can furnish you with dependable Punches and Dies for all makes of Power, Hand or Foot Punching Machines and Presses, immediately from stock, in 29 sizes ranging from 5/32" to 1½" punching diameter. Special sizes and shapes to meet particular requirements are made to order promptly.

It you are interested in economy, investigate the savings offered by The Cleveland System of Standardization for Punches and Dies by which it is possible to punch various sizes of holes by the use of the same nut and punch stem.

THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.

PUNCHING TOOLS & DIES

OFFICES AT NEW YORK CHICAGO DETROIT PHILADELPHIA PITTSBURGH

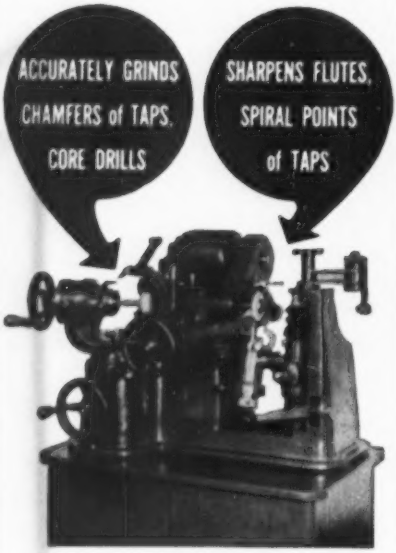
Established 1880

POWER PRESSES

FABRICATING TOOLS

CLEVELAND 14, OHIO

THE MODEL 1100 HYBCO TAP GRINDER



- Capacities No. 2 Mach. Screw to 1½" Hand Taps.
- All Settings Adjustable To Give Any Angle—Relief—Hook.
- Taps Held in Precision Collets Can Be Sharpened After Center Is Destroyed.
- Standard Motor—Any Current Specification.

Representatives In Principal Cities

Henry P. Boggis & Co.
708 East 163rd Street
Cleveland 10, Ohio

enough to make the inexperienced person realize that doing business with the Government is complicated and tedious.

People experienced in doing business with the Government will agree with points which the U. S. Chamber of Commerce outlines. The experienced person knows that doing business with the Government is far more difficult than the Outline indicates. Study the department and personnel with whom you are dealing, find out how they look at things and their terminology. They prefer the word negotiating in place of selling. Engineering consultation seems to be acceptable where the word selling is objectionable. A contractor's representative is preferred to a salesman, even though the same man is a salesman to industry. Use the accepted terminology.

In the Procurement Regulations we find that each invitation for bids must:

1. Give a complete and accurate description of the item required by the Government.
2. State delivery required.
3. State quantity required.
4. The laws and regulations applicable to the bid.

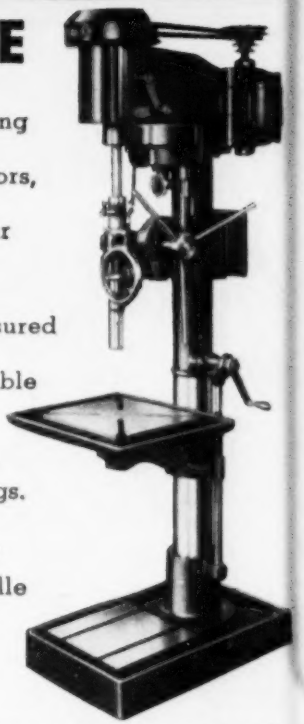
The complete and accurate description of the items required by the Government is usually a specification.

When specifications are written this is the most important preliminary point to issuing a Bid invitation. We can be of help in writing the specifications because the specifications writer must turn to someone beyond catalogs. It is at this point when we can be of valuable help or place ourselves in a bad light. This can be done by getting an inexperienced person to write up specifications which

SIBLEY

MODEL C-20

DRILLING MACHINE



QUALITY 70 years manufacturing drilling machines provides quality standards. All parts except motors, switches, V-belts and bearings produced in our plants. High tensile strength castings made in our foundry under laboratory analysis control.

ACCURACY Table alignment is assured by boring table arm with spindle furnished on machine. Surface of table is maintained at 90° to spindle within .0007" in six inches. Precision ground spindle has two ball thrust bearings. Spindle driving sheave and back gear are supported by two ball bearings.

FEATURES 20" swing; drills 1½" in mild steel; 8 spindle speeds from 65 to 1360 R.P.M.; geared power feeds; simple and convenient controls; automatic spindle stop; rectangular oil groove table. Powered by a 2 H.P. motor.

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SIBLEY MACHINE & FOUNDRY CORP.
39 East Tutt St., South Bend 23, Indiana

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will definitely rule out all competition and leave us a sole bidder. This can cause questioning and serious embarrassment to a public servant, and a drop in our standing and the standing of our company. Remember that the Government aims to get at least three acceptable bids.

We must go beyond the booklet for an understanding of conditions in Government which we do not find in industry.

We must also get an understanding that when we say we are doing business with the Government, that it is a general term, because actually the Government is a collection of agencies and service branches, each with agencies, branches or departments and there is little correlation between these particular offices.

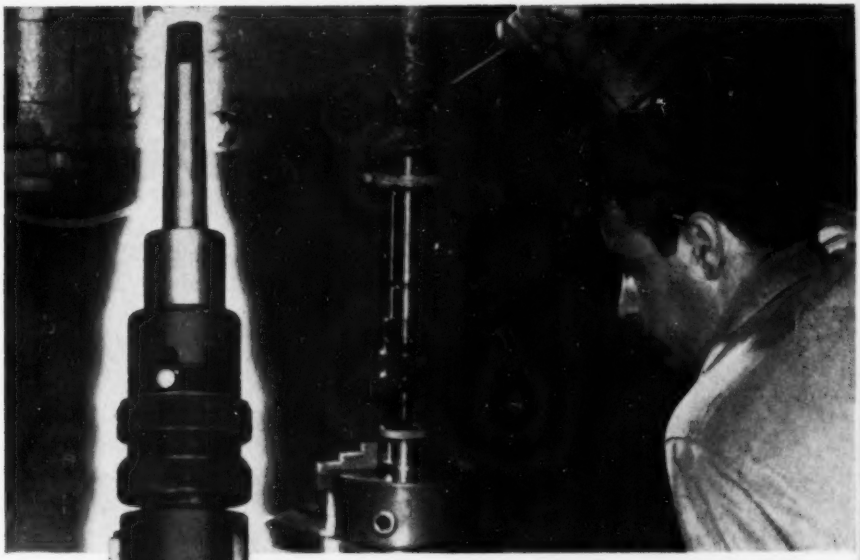
Our job is to determine which of these agencies, services or departments can use our machine tools.

In our efforts to determine who can use our machine tools, we come in contact with the people of these departments and we must work with these people even as we work with the people in industry.

Government personnel have a different viewpoint from industrial personnel, because their basis of employment is different. The majority of the Government personnel are civilians, most of whom are under Civil Service; the balance are the uniformed personnel of the Armed Services.

We find Government person-





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Standard Series "R" Recessing Tools are available to cut recesses from ¼ to 4¼ inches in diameter. Write today for catalog "R" . . . .



Precision boring with MASTUR heads is described in catalog PBH. These inexpensive tools feature large capacity, adjustability and accuracy. Specifications are charted.



Production Boring with the E-Z set line of Boring heads is subject of catalog No. 30. Complete line of tools is shown. Prices, capacities and specifications are charted for reference.



THE MAXWELL COMPANY

327 BROADWAY • BEDFORD, OHIO

nel who do not make the news. These competent people are doing a magnificent job, underpaid for the caliber of their work. These people are the bulwark of Government departments. Industry has tried to entice these men from the Government Service, but they stay on, because they like Government Service. Working with these men is a pleasure and does not call for eternal patience.

The uniformed personnel with whom we come in contact are usually officers. In the Armed Service each office or branch has one or more officers in charge of the department. In the main, the officers are concerned with the administration of the department with the civilians headed up by a civilian chief as the operating end. In a sense the officer's stay on a job is temporary, and is known as a tour of duty, which rarely extends beyond several years. The civilian personnel are the working force of any Government office. We must cultivate these officers so we know the extent of their influence in the department. If the officer is concerned with administration only, he is usually curious about the people who visit his civilian personnel. There are officers who go beyond the administrative end and into the actual work of a department. This group of officers are usually capable and well to work with.

There are many people who are gentlemen when calling on industry, but proceed to be very rude when calling upon the Government Departments. In industry, rudeness such as shown to some Government employees, would result in forever closing the door. It is not possible to close the door to the rude callers in the Government, but it is possible for the Government em-

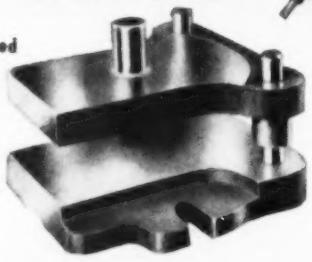
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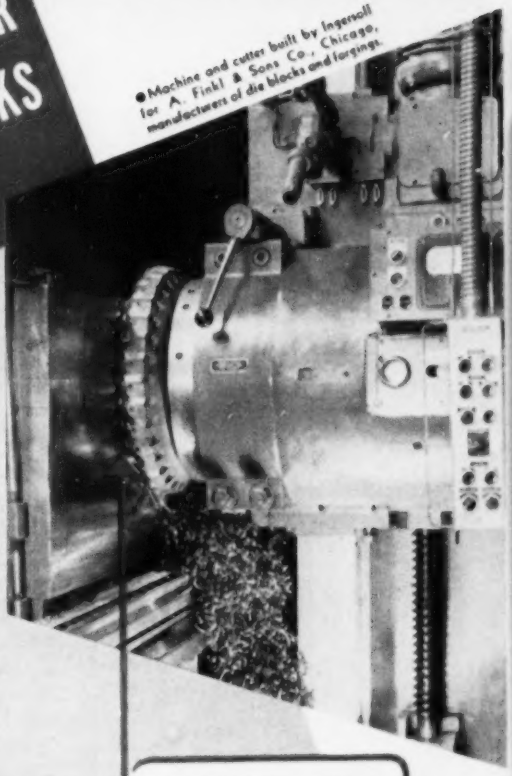
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INGERSOLL

SHEAR CLEAR CUTTER MILLS DIE BLOCKS with CARBIDE



● Machine and cutter built by Ingersoll for A. Finkl & Sons Co., Chicago, manufacturers of die blocks and forgings.

● Die blocks now are being milled by this 24" Ingersoll Shear Clear face mill with carbide-tipped blades at a feed rate 10 times as great as the feed rate obtained with high speed steel cutters. Removing surface impurities from the impression faces of die blocks is a difficult operation because of the material's extreme hardness and toughness.

This new cutter and a 60 h.p. Ingersoll Openside Milling Machine with a 22"-diameter quill have made carbide's higher cutting speed workable for die block milling. Cuts 22" wide are taken and good finishes are obtained.

High speed steel cutters machine 15,000 square inches of this tough material in 100 hours, during which they have to be reground four times. With carbide, the same work is done in 10 hours without regrinding the cutters.

DIE BLOCK 300 to 375 BRINELL



● The experience we have gained in working on tough jobs such as this may be of assistance if you have a particularly difficult job to do in your own shop. We would appreciate an opportunity to work with you.

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"THE ORIGINAL MARKING SPECIALISTS"

ployees to make the path of rude people a very arduous one. Some of the reasoning used by people approaching the Government is very bad. The most familiar one is the approach with a chip on the shoulder and a statement, "I am a taxpayer and I demand my rights. I will see my Congressman." This and many other moth eaten statements or threats do not further our purpose.

Let us remember the basis of Government jobs. Let us understand the futility of tangling with Goverment personnel, because in the main their job is more permanent than our own. We only injure ourselves when we quarrel with someone that is located in a job for which he is not suited.

The Civil Service System put these individuals in the job and they will not be readily removed. When we understand these people and approach them in a helpful manner, we will be welcomed because the majority of these people in Goverment know that they need help on certain subjects and welcome capable help. When we know these people well enough so that they have confidence in us and believe in us, we are in a position to help the man handle his job, which may be new to him, and at the same time help ourselves and our company. This may sound easy, but it does call for unlimited patience.

We must not only seek out the Department using or which can use our tools, we must seek out the personnel of the Deparment who are involved in the use and purchase of machine tools. When we conduct ourselves properly, understand our products, and are helpful to government personnel, we will find ourselves cordially received and our help very welcome.



Trimming Formed Parts

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THE TANNEWITZ WORKS, GRAND RAPIDS, MICH.

In industry we seldom visit all the people involved in machine tool purchases. In Government we can, if we handle ourselves properly, see all of the people along the path of the machine tool buying. In Government it means contacting many more people of more departments than we do in industry. More time and patience are required.

We are concerned with our work of selling machine tools. In Government we will find many people who will discuss the subject. The job is to find the person who can and will decide a machine tool is required and show this man our tool is best suited for his requirements.

The next step is a requisition for the machine. The completeness of this requisition is a determining factor in the eventual placing of the contract. The requisition may be written by a second person. The requisition may travel through a specification branch. The requisition, along with the specification, then travels through channels where it may be altered at various points. We can follow this requisition through channels, helping various persons understand it, and try to keep it within the realm of possibility.

The whole procedure involves an abnormal amount of time because of the number of people who must be consulted. Along with the expenditure of time, great patience is required. Where two or three catalogs may suffice for a commercial transaction, many catalogs are required for the Government transaction. Catalogs may have to be supplemented by suggested specifications and additional data.

When you receive an invitation to bid, do not fail to read the invitation



Sharpen Up!

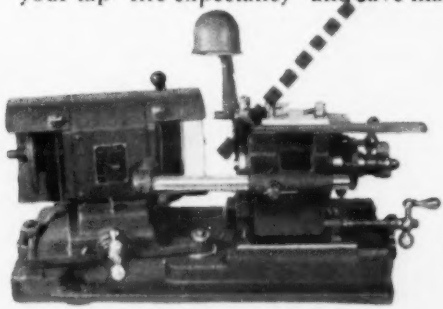


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Now you can get full production from your taps and reduce breakage due to dull chamfers. Inexpensive Blake Tap Grinders accurately, economically, and *quickly* grind uniform chamfers on 2 to 10 fluted right or left hand taps. Only a few seconds are required to insert taps for grinding and no special training is necessary for operating. Here is the easy, sure way to increase your tap "life expectancy" and save many $$.



Remember, if you grind a drill, you can't afford not to grind your taps! Sharpen Up — (With a Blake Tap Grinder, of course).

Write for Bulletin 549S which tells about "Modern Tap Sharpening"



EDWARD Blake COMPANY

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Black Diamond Precision Drill Grinders . . . Blake Tap Chamfer Grinders . . . Blake Flute Grinders . . . Waltham Cutter Sharpeners . . . Waltham Thread Milling Machines . . . American Tool Holders . . . Surface Finish Standards.

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to bid, fine print and all. Study it carefully, there may be some new requirement. If there is an obvious mistake in the invitation, the Government will welcome your politely calling attention to this mistake and it will be corrected by an amendment. If there are two interpretations to a specification or invitation to bid, we had best bid both ways because this will not be clarified for us prior to the opening of the Bid.

While it is well to know the civilian at the top of each department, our groundwork must be with the operating personnel of the department.

With this understanding of Government operations and eternal patience on our part, we are equipped to be a contractor's representative and use our machine tool knowledge to the benefit of the Government and our company.



"A necklace you made for me—Has it the old-fashioned catch??"

NOW . . . USING STEEL PLATE SHAPES IS

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You start one step ahead—that much nearer the finished job—with By-Products steel plate shapes. Flame-cut, sheared, bent, pressed or blanked to close tolerances, they're ready for quick finishing and assembly.

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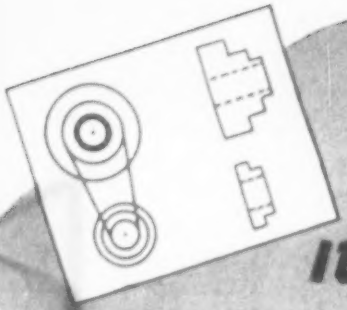
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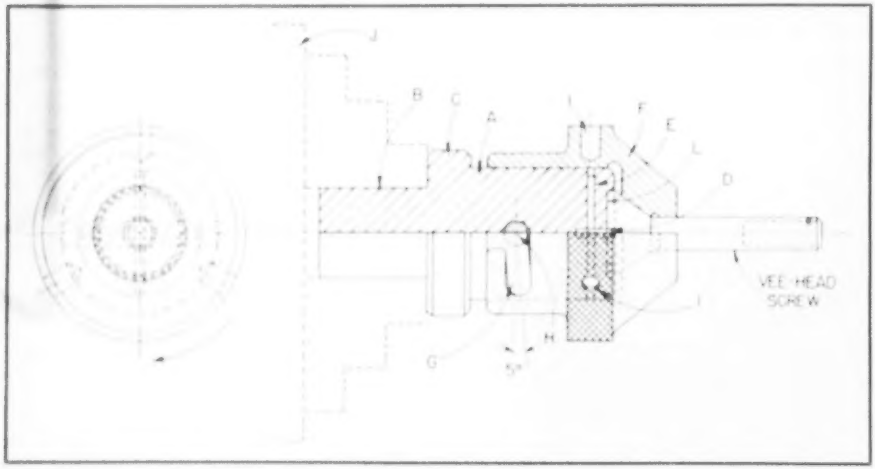
IDEAS FROM READERS

Chucking Device for V-Head Screws

By W. M. Halliday
England

THE drawing herewith shows a handy chucking device developed for the purpose of holding special-thread V-head screws which, in order to be usable, had to be rethreaded after having been erroneously machined with regard to thread length. Since the V-head of each screw had already been polished and buffed, it was necessary that the screws be held firmly without marring the finished surfaces.

Referring to the drawing, the chucking device consists essentially of two main members; namely, the body **A** and locking nose cap **F**. The body is a cylindrical steel piece having a shank, **B**, at one end which is gripped in an ordinary self-centering three-jaw chuck, **J**. The opposite end of the body is machined to a larger diameter than



Drawing of chucking device for V-head screws

10 MILLION GALLONS OF *Lusol* SOLUTION

HAVE REVOLUTIONIZED SHOP THINKING

ON MACHINE SPEEDS ✓ TOOL LIFE ✓ PRODUCTION COSTS ✓

It is no longer a matter of opinion — 10 million gallons of Lusol solution have been used in exhaustive testing and practical plant applications. It is being used with such success in some of the country's leading plants that they are chary about specific publicity to their competitors.

AN ENTIRELY NEW CONCEPT ON COOLANTS

Cooling, rather than lubrication, at point of tool contact has made possible 300% to 400% greater speeds, less tool wear, less tool breakage, finer finish, greatly increased production . . . a concept many won't believe until they have tried Lusol . . . a concept Lusol users enthusiastically accept and are using today to their competitors' discomfort.

OPERATORS ARE BOOSTERS

Take the operator who has his hands in coolant all day long — give him Lusol that is clear and clean — like a mild soap solution — no skin irritation — a clean machine — a clear solution that allows him to see his work as the finest drill comes down to the work piece — perfect vision — easier to work with — it changes the whole working aspect of a shop — clothes and shoes no longer soaked in old type coolants. Add to this fewer tool changes, less wheel dressing, far greater speeds, and production picks up with less effort, less operator fatigue. We've never found an operator yet who wants to go back to the "old way."



A bar of 18-8 stainless steel was being cut in 20 minutes. When Lusol was used with the same size bar, same material, same operator, same machine, same tool, the cutting was done in 2 minutes.

Hard to believe, and all Lusol results are hard to believe unless you can accept an entirely new concept of the use of coolants. Lusol cools —rather than lubricates. On the case above, speeds were increased from 30 RPM to 267 RPM. Previously the operator had been breaking tools with fair regularity. Since using Lusol he has broken none. Old type coolants had kept the operator constantly annoyed with skin eruptions. Since using Lusol he has had none.

SOONER OR LATER

Sooner or later someone is going to ask you why you haven't checked into Lusol before. Sooner or later you are going to find out that it does just what the first 10 million gallons have proved. Investigate this way to improve your production NOW. It's more profitable to lead than follow.

LOOK AT THESE FIGURES...
THEN SEND FOR THE CASE HISTORIES

BROACHING

- 266% greater production per broach grind
- 275% greater production per broach grind
- 125% greater production per broach grind
- 128% greater production per broach grind

DRILLING & TAPPING

- Saved 70% Drills, 68% Taps
- Tap life increased 1300%
- Drill life increased 3300%
- Saved 90% Drills, 75% Taps

GRINDING OPERATIONS

- Grinding time reduced 25%
- Saved 97½% scrap
- Over 200% more pieces per wheel dressing

CASE HISTORIES YOU CAN'T AFFORD TO OVERLOOK

Lusol

SAVES TOOLS ▼ SPEEDS WORK
CUTS COST

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228 Brownstone Ave. Portland, Conn.

Please send me your case history material on:
☐ Broaching ☐ Drilling, Tapping ☐ Grinding

Name

Company

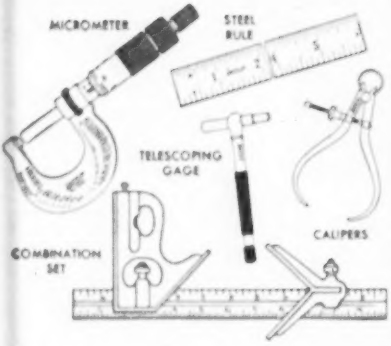
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THE LUFKIN RULE CO. 72C

SAGINAW, MICH • NEW YORK CITY • BARRIE, ONT.

that of the shank and case hardened to resist wear. Situated between the shank and the larger front portion of body **A** is an enlarged shoulder, **C**, which serves as a stop when inserting the shank in the lathe chuck, thus enabling the chucking device to be installed in precisely the same position each time in the lathe chuck.

To accommodate the head of the screw to be rethreaded, a shallow recess, **L**, is machined in the center of the end face of the body **A**, the diameter of the recess being approximately 0.005 to 0.008 inch larger than the maximum diameter of the head portion of the screw to enable it to be easily slipped into place. The bottom of the recess is machined absolutely flat so as to afford a uniform bearing surface for the end of the screw head. The walls of the recess are tapered slightly to allow the operator to insert and locate the screw more easily and quickly.

To ensure positive retention of the screw during rotation of the chucking device, a fixed driving tongue, **D**, is provided in a slot milled centrally across the end face of body **A**. This tongue is sufficiently wide to extend a short distance beyond the end of the body for engagement with the screw driver slot in the screw head. The entended portion of the tongue is slightly radiused at each side to ensure easy entry into the slot in the screw head. To prevent accidental disturbance of the tongue in its slot, a hole is drilled through the body **A** and tongue and a pin, **E**, driven therein.

The hardened steel nose cap **F** is accurately bored out to a depth of about two-thirds its overall length so as to provide a close-sliding fit on the body **A**. The remainder of the cap is bored out accurately concentric with the



Gage Block Set 35A. Larger or smaller sets, and individual blocks, are also available.
Below: Set of Tungsten Carbide Wear Blocks.

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A strong statement — ***but fact!*** Taft-Peirce Gage Blocks are made from the finest alloy steel, carefully hardened and seasoned. Surfaces lapped to the highest degree of flatness and finish insure the ultimate in accuracy and durability. Dimensions, clearly marked on the edges, are always visible when in use — a Taft-Peirce exclusive.

The 35A Gage Block Set permits all dimensions from .300" to 8.000" in steps of .0001" to be obtained — a truly economical set! For a wider range, the 82A Set, consisting of 81 blocks and an extra, measuring .10005", provides all dimensions from .200" to 12.000" in steps of .0001" and from .300" to 12.000" in steps of .00005". Tungsten Carbide Wear Blocks, measuring .050" and .100", are also available to increase the life of any gage block set. Write for more information today.

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Branch offices in all major cities

T-P means TOP PRECISION

previously bored hole in such a manner as to provide a close fit on the shank portion of the screw to be gripped. At the internal junction of the two holes, a conical recess is machined which conforms precisely to the angle of the sides of the screw head. The front end of the nose cap is tapered sufficiently on the outside to enable it to pass into the hole in the front retaining plate of the self-opening die head used for the rethreading operation thus, allowing the die head to travel well along the screw shank without interference. At the crest of the conical portion, the cap is enlarged slightly for a short length and knurled to provide a gripping surface.

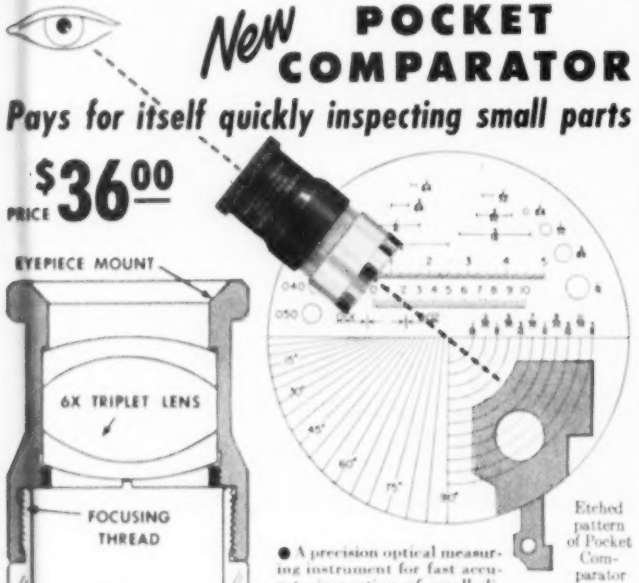
For locking the nose cap on the body **A**, a bayonet slot is machined in the cap as shown at **G**, the slot being of sufficient width to accommodate the locking pin **H** which is driven firmly into the body and allowed to project therefrom an amount equal to the wall thickness of the nose cap at that point. It will be noticed that the longest portion of the bayonet slot immediately behind the lateral entry part is inclined at an angle of approximately five degrees to the end face of the cap in a direction leading toward the workpiece.

The drawing shows a screw located in position in the recess in the body **A** and with the nose cap installed but not moved radially into locking position. To lock the cap firmly in place, it is mere-

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cross-section of Pocket Comparator (actual size)
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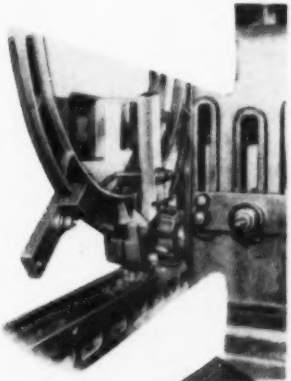
National Tools Cleveland

OK Carbide Cutters mill vital "Thunderjet" forgings – II

As reported previously, Liberty Products Corporation, Farmingdale, L.I., produces the forged-steel bulkhead for Republic Aviation's F-84 "Thunderjet." This vital assembly provides the connection point for the wing spars, and hence every milling operation must be . . . properly performed – yet at minimum cost.



"properly performed ... at minimum cost!"



SECOND OPERATION on these tough, heat-treated forgings involves milling the spar-connection bosses to proper thickness. To do this, the piece is clamped to a box-section fixture set up on a Kearney & Trecker No. D-11 duplex milling machine. The two bosses are milled with a 7-in. dia OK face mill having negative axial and radial rakes and fitted with carbide-tipped blades. Spindle speed is 200 rpm.; table feed 5.3 in. per min. This figures out to a cutting speed of 360 surface ft. per min., and a chip load of 0.0022 in. per tooth.

It is important that these bosses be smoothly milled to a thickness tolerance of 0.005 in. (actually 0.004 in. is easily maintained). Production amounts to three pieces per hour, both sides of two bosses being milled. Nine pieces are obtained per cutter grind.

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ly turned on the body in a clockwise direction so as to allow the pin **H** to pass along the inclined portion of the slot **G**. When this occurs the cap is gradually drawn toward the left, thereby securely gripping the screw on the tapered portion of its head and firmly forcing the head against the base of the recess in the body. Since the tongue **D** is engaged at the same time with the screw driver slot in the screw head, the screw is firmly held in place so that slippage cannot occur when a rotating movement is imparted to the chucking device.

Since the front portion of the nose cap is bored to provide a close fit on the shank of the screw immediately in front of its head, the screw is automatically aligned in the proper position when locked in the chucking device. Before placing the nose cap **F** on the body **A**, the screw, of course, is inserted through the cap, shank foremost. A number of blind holes provided around the narrow knurled shouldered portion of the nose cap, as shown at **I**, enable the operator to insert a short piece of rod for use in tightening the nose cap in place and in releasing same after the threading operation is completed.

Adaptation of a Turret Lathe

TOO old to compete successfully with its more modern counterpart in metal turning, the thirty-one-year-old cone-drive Warner & Swasey turret lathe shown in the accompanying illustration nevertheless is far from being ready for the scrap pile. Converted to a centrifugal casting machine in the Federal-Mogul plant in San Francisco, it is used for the pro-

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Molten metal is shown being poured into the filler spout of a veteran turret lathe which has been converted to a centrifugal casting machine.

duction of large solid bronze bearings and for lining steel or bronze bearings.

Cylindrical molds like the one shown at the left—or the bearing itself in case of a lining job—are held between flat faceplates fixed to the spindle nose and turret slide. The latter plate has a hollow bearing which connects with a filler spout mounted on the slide. When the machine has been brought up to speed, molten metal is poured

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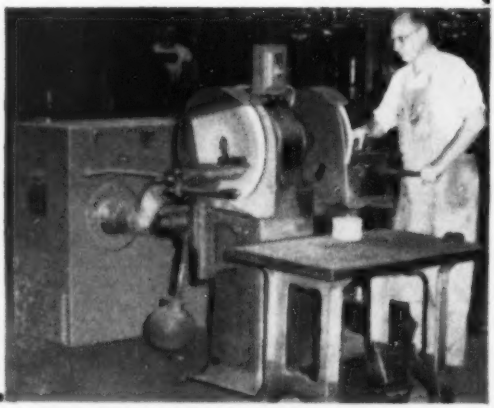
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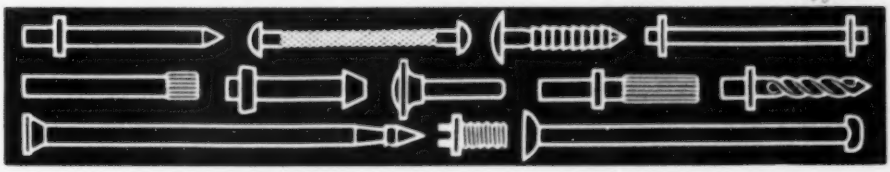


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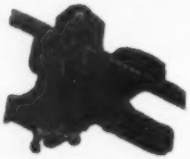


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125A	5/8	11	1/4	4.50
126A	3/4	13	1/4	6.50
127A	1	14	1/4	7.50
128A	1 1/8	16	1/4	9.75
129A	1 1/4	18	1/4	13.75
130A	1 1/2	23	1/2	17.75
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155A	2 1/2	36	1/4	79.50

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2-A	5/8, 1 1/8, 1 1/4	16" to 18"	39.85
3-A	3/4, 1 1/8, 1 1/2	20" to 22"	68.95
4-A	1 1/8, 1 1/4, 1 3/4	24" to 36"	99.75
6-A	1 1/2, 1 3/4, 2 1/2	24" to 36"	212.85

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into the filler spout, from where it enters the cavity between the faceplates and is thrown against the mold by centrifugal force. The machine base removed to provide a convenient pouring height, and other non-essential parts were also removed; parts of the bedways were chipped away to permit swinging large-diameter molds.

The veteran turret lathe was converted to mold spining in 1945, and has served continuously in that capacity ever since, operating on regular production alongside newer machines designed specifically for centrifugal casting.

Magnetically-Held Tap Guide

By F. E. Riley

VARIOUS types of magnetic blocks are now available for the mounting of dial gages and other instruments in awkward places. Another use which has been discovered for blocks of this type is for holding tap guides in such a position that holes can be tapped absolutely vertical to flat surfaces. The advantage of using a tap guide in combination with a magnetic holding block lies in the fact that holes can be tapped in steel or iron surfaces that are located in a horizontal or vertical plane or overhead. The magnetism of the block is sufficient both to hold the tap guide in the desired position and to also cause the block to adhere firmly to metal surfaces, such as iron and steel, without the need for clamps or other holding means.

The tap guide shown in the accompanying sketch was designed for use with standard taps from 1/4 to 3/8-inch in diameter. It consists of a V-block,

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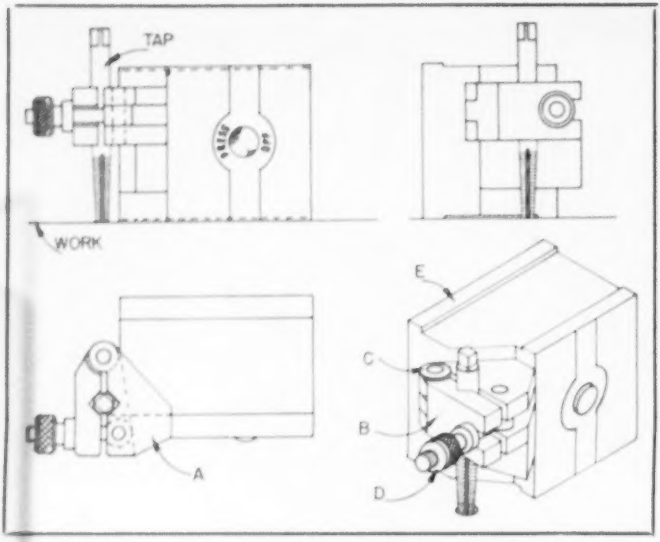
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Sketch of magnetically-held tap guide

A, which accommodates the plain portion of the tap shank, and a clamp, **B**, for holding the tap shank in the vee.

The clamp is hinged to the block by a bolt, **C**, and includes a thumb nut, **D**, which permits tension to be applied on the tap shank so that the tap can be rotated within the vee without vibration.

The magnetic block **E** has a vee portion which enables it to be mounted on a boring bar where a firm setup is provided for locating the tap guide in an absolutely vertical position. In this position, the tap guide can also be adjusted up or down to accommodate long or short taps.

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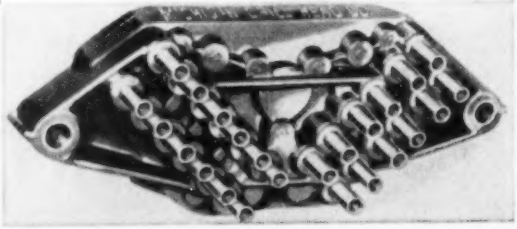
By Federico Strasser

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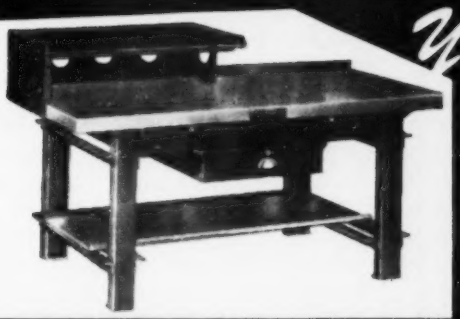
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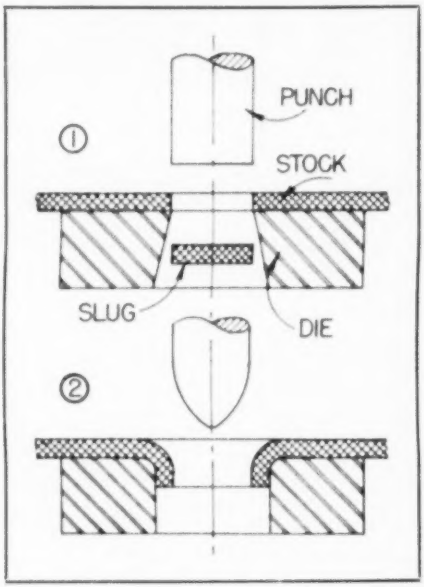


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monly used methods for punching such holes is shown in Fig. 1 of the accompanying sketch. This method involves the use of a progressive type die with conical hole to permit the slug to drop through the die. The punch used is slightly smaller in diameter than the hole in the die and has a flat surface on the end. After punching, the hole



Sketch showing method for increasing threadable length of hole punched in sheet metal

is tapped; however, the thread length can only correspond to the material thickness which, in many cases, is not sufficient to provide ample thread length for the job at hand.

Fig. 2 shows a method whereby sheet metal can be punched to provide 2 to 3 times as much stock thickness for tapping. This method makes use of a special embossing type die and a punch with point-shaped end. The diameter of the hole in the die is equal

to that of the punch plus twice stock thickness. In addition, the hole is rounded slightly at the top to eliminate sharp edges. Moreover, the hole is straight walled instead of conical.

In operation, the point-shaped punch does not actually cut the metal as in the case of the standard punching die but rather opens the hole by tearing apart the molecules of the stock so that instead of a slug resulting, a boss is produced which increases the threadable thickness of the metal by two to three times. A disadvantage is that the boss produced has ragged edges caused by the tearing action of the metal; however, where this is objectionable, a small hole can be punched in the metal before producing the boss type hole with the point-shaped punch. This will eliminate any ragged edges on the boss.

Adjustable-Tension Belt Drives

By John E. Hyler

FREQUENTLY, after a flat belt drive has been installed and operated for a short length of time, it is necessary to take up slack in the drive due to a certain amount of stretch occurring in the belt. In many instances where a flat belt drive of considerable length is operated in practically a horizontal position and where belt sag is in the top strand of the belt, thereby increasing rather than reducing the arc of contact of the belt on the pulleys, the drive will function quite effectively even though the belt is loose. This fact is particularly true of rubber belting and mineral-tanned leather belting, assuming that both pulleys in the drive are of generous diameter.

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On short-center flat belt drives, such as shown in Fig. 1, it is generally necessary to employ either a wrapper pulley to provide a greater arc of contact on the smaller pulley involved or to use a tilting motor base, so designed that the weight of the motor keeps the belt at constant tension regardless of variations in humidity. On close-center drives, V-belts have been found to

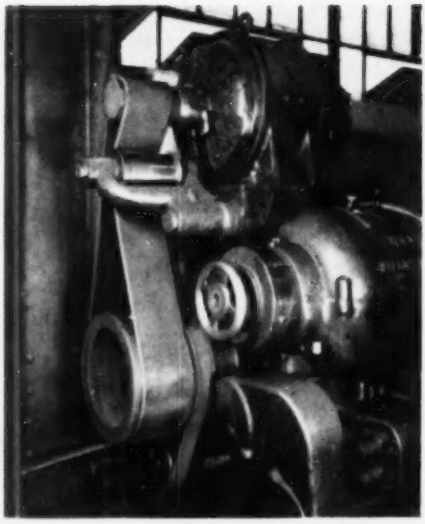
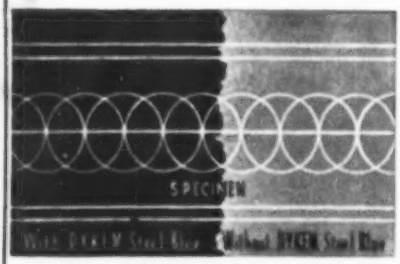


Fig. 1—This illustration shows a short-center flat belt drive applied to a lathe installed in a steel plant. The wrapper pulley, operating by gravity to maintain proper tension, also increases the arc of belt contact on both pulleys.

operate particularly well because of their wedging action in the sheaves; however, in many cases where a large number of endless V-belt drives are employed, it is necessary to keep spare belts of many different sizes on hand to ensure continuous operation of the drives. Some firms have attempted to standardize their different drives, making them as much alike as possi-





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ble, with the idea of reducing V-belt inventory.

A particularly good means for reducing V-belt inventory is afforded by using linkage-type V-belts, such as shown in Fig. 2, which are actually adjustable for length and, therefore, for operating tension. These belts are made in all standard cross-sectional

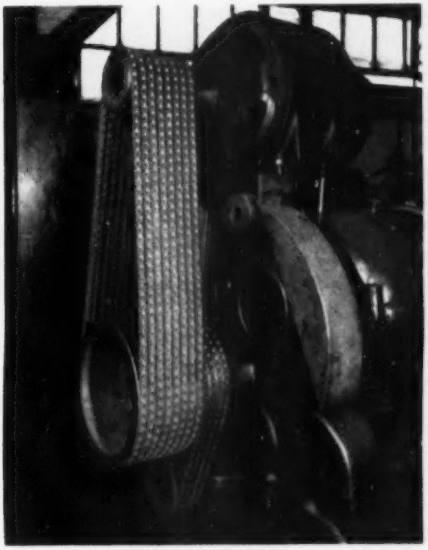


Fig. 2—In this illustration, the wrapper-pulley drive shown in Fig. 1 has been replaced with an eight-strand V-belt drive of the type employing link-style belts which are readily adjustable for length.

sizes, and the links from which they are assembled are made of layers of duck impregnated with rubber compound and vulcanized together. Each belt link is fitted with a stud and provided with holes which fit over the studs in assembly. Thus, a belt can be tightened by simply uncoupling it and removing one of the links, after which it is recoupled. In addition to this adjustment advantage, the fact that such linked-together material can be

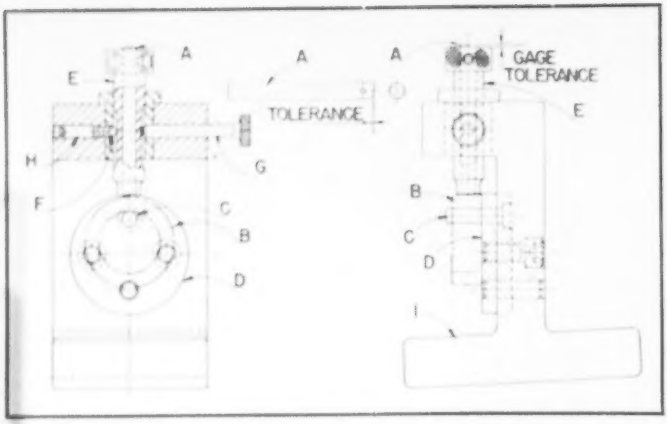


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Sketch of concentricity gage

stocked on reels and that a V-belt of any desired length can be made on short notice from this lineal stock makes it possible to adequately maintain many V-belt drives with a very low belting inventory.

(Illustrations furnished courtesy Manheim Mfg. & Belting Co.)

Concentricity Gage

By Carl Thompson

THE accompanying sketch shows a gage which is designed to provide a quick, accurate, and economical means for checking the concentricity of a part where the bore diameter and outside diameter are to be maintained with a given tolerance. The gage is flexible in that it can be used for checking small as well as large parts with any bore diameters.

Features of the gage include a gaging pin, **A**, a set of which can be made up with various tolerances so that pins can be interchanged when checking different concentricity tolerances on parts.

To use the gage, the part, **B**, to be checked is placed on the plug **C** in such a manner that the part rests against the bearing plate **D**. The outer sleeve **E** on the gaging pin **A** is then

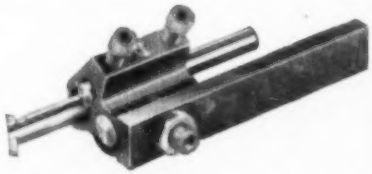


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pressed down to contact the part, after which the part is given one complete turn. This operation enable the spring-loaded ball **F** to hold the sleeve **E** at a position corresponding to the largest wall thickness of the part. The sleeve is then locked in place by a thumbscrew, **G**. A set screw, **H**, is provided for retaining the spring-loaded ball **F** and for use in adjusting tension on the sleeve **E**. The part is now given another complete turn on the plug **C**, with the operator sighting the gaging pin **A** at the same time to see that the part is concentric within tolerances to be maintained.

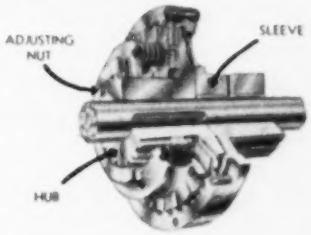
The cast base, **I** of the gage is on an angle so that the part, when placed on the plug **C**, will rest fully against the bearing plate **D**. If desired, an adjustable guide can be used to hold the part in the center of the gage.



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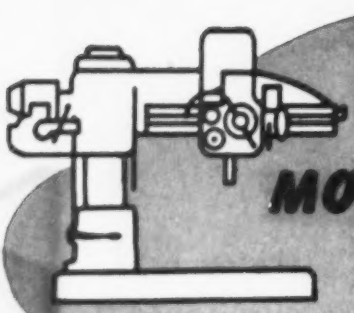
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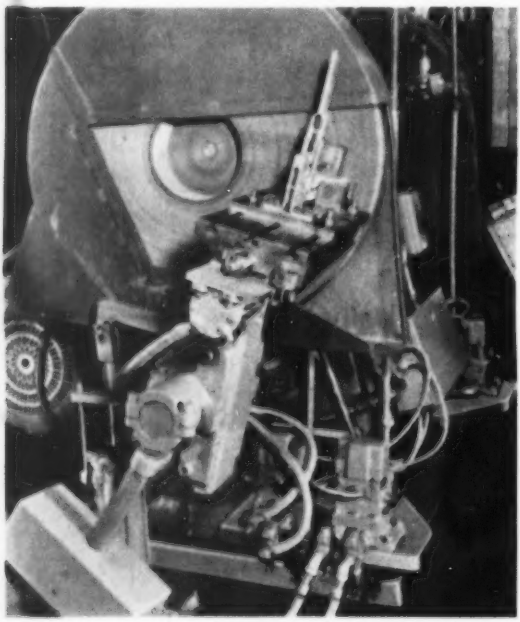
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At the right in Fig. 1 the grinding fixture is shown in the loading position with the table retracted from the grinding wheel. At the left, the position of the grinding fixture is shown during the grinding cycle. Another view of this portion of the cycle is shown in Fig. 2. Figures 3 and 4 schematically illustrate the use of values and cylinders and the electrical circuit required to produce the desired sequence of operations. Fol-

Fig. 1 — Close-up view of the left grinding fixture. The loading and positioning air cylinder (partially behind the counterweight), operating linkage, cam A, solenoid and speed control valves and in-feed cylinder (base of loading table) are shown.

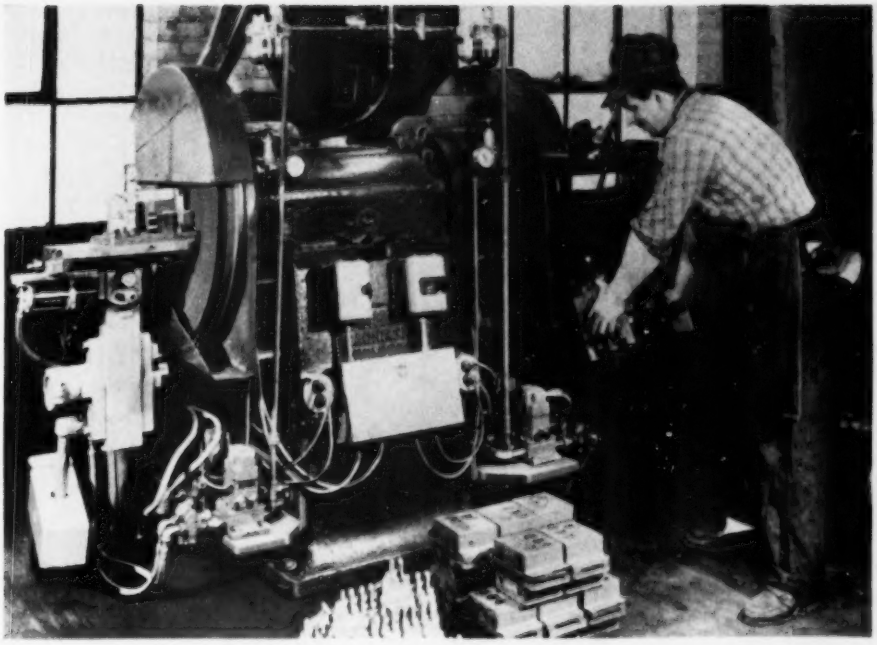


Fig. 2—Front view of the twin disc grinder, showing the operator loading the right fixture while the left fixture operates through its grinding cycle

lowing is a description of this sequence.

At the start of each cycle, the piston of cylinder **X** is extended and the loading table is retracted from the grinding wheel. In this position, normally open limit switch No. 1 is held closed by contact of cam **A**. The cycle is initiated by pressing starting button of the time relay. This action, in turn, energizes relay No. 1 and solenoid No. 1. Air is introduced in the rod end of cylinder **X** and the table moves across the grinding wheel parallel to the face. When the rod is retracted so that cam **A** contacts and reverses switch No. 2,

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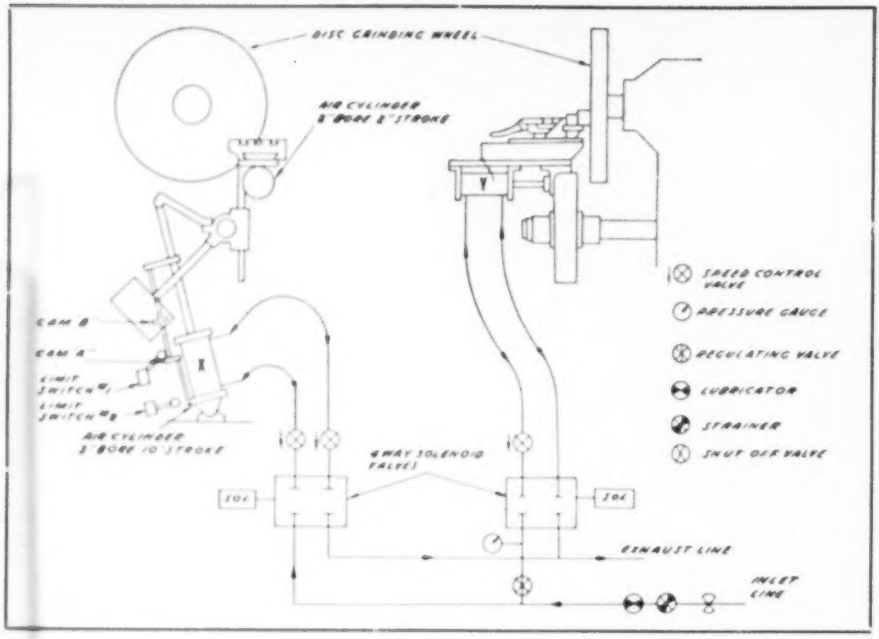
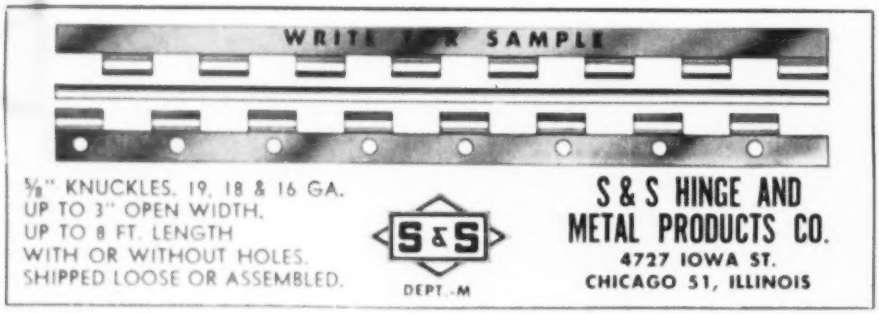


Fig. 3—Schematic diagram of the air circuit

two actions take place simultaneously —switch No. 2 energizes relay No. 2 and solenoid No. 2. Thus, air is introduced to the blank end of cylinder **Y**, advancing the work into the grinding wheel. At same time, relay No. 1 and solenoid No. 1 are de-energized, reversing the valve and introducing air to the blank end of cylinder **X**. Cam **B** then contacts limit switch No. 1, and the rod of cylinder **X** retracts. This oscillating motion across the grinding wheel continues until the entire circuit is de-energized.

Length of stroke across the grinding wheel is controlled by adjustment of



cam **B** to suit the part being ground. At the end of the time cycle, all relays and solenoids are de-energized and the table returns to the loading position. Adjustment of speed controls permits withdrawing of the work table before the table returns to the loading position. Speed of oscillating motion and

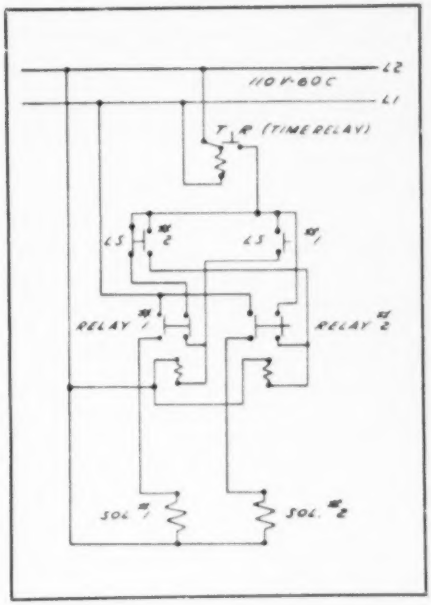


Fig. 4—Wiring diagram for the operation of the air circuit.

in-feed of the table are likewise controlled through the use of speed controls. Pressure of the part against the grinding wheel is controlled through a pressure regulator, which is adjusted to provide the required pressure on cylinder **Y** to suit the material being ground and the type of wheel used. Controlled pressure and full use of the entire face of the wheel result in longer wheel life and fewer dressings of the wheel.

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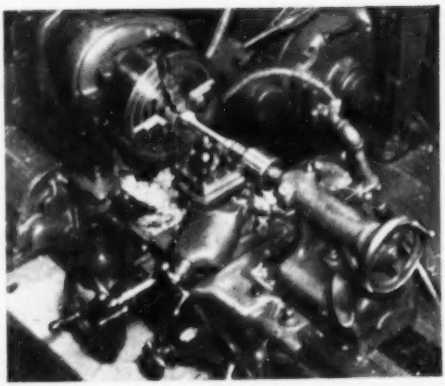
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Send for Bulletin 131 for further description

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Precision Turning Cuts Cost of Producing Aircraft Carburetor Parts

USING a small precision bench lathe, the F. J. Kester Company, Edwardsburg, Michigan, has solved the problem of economically producing aircraft carburetor parts to exacting specifications for one of the largest manufacturers of aircraft equipment



Machining aircraft carburetor control link on 9-inch precision bench lathe

and accessories. One of the parts was a control link made from 24ST4 rectangular aluminum bar stock $\frac{1}{2}$ x $\frac{7}{16}$ x $4\frac{3}{4}$ inches. The center had to be reduced to $\frac{1}{4}$ inch diameter, with a surface smoothness of 100 microinches r.m.s. or better. Usual procedure would have been to first machine the part in a lathe and then finish by grinding to obtain the required surface smoothness. It was obvious that a considerable saving could be made if the grinding operation could be eliminated.

A 9-inch swing South Bend precision bench lathe was tooled up for the job. Longitudinal feed stops were used to locate both ends of the cut. A cross-feed stop was used to position the cut-

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ting tool for the diameter. Two high speed steel combination forming and turning tools mounted in a square turret tool block were used to perform all forming, rough turning, and finish turning operations. The workpiece was driven by a 4-jaw independent chuck and supported in the tailstock by a special revolving center. A simple adapter in the 4-jaw chuck allowed for the insertion and removal of the work by opening only one chuck jaw, so that no recentering was required.

With a little experimentation, the correct spindle speeds and feeds were established, and the most satisfactory clearance and rake angles for the cutting tools determined. The results were surprising. The specified surface smoothness of 100 microinches r.m.s. was easily surpassed. An average finish of 30 microinches r.m.s. is now being maintained on a production basis, taking one roughing and one finishing cut over the center section of the piece.

Equipment Machines and Assembles 248 Refrigerator Pistons per Hour

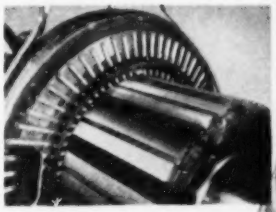
A FOUR-WAY horizontal drilling machine manufactured by National Automatic Tool Company is currently being used to machine and assemble 248 refrigerator pistons per hour. The machine, as illustrated, consists of one vertical unit and head with standard column-wide ways; left front and rear horizontal units and drill heads; and a special unit for pressing in tubes, cutting off and inserting brazing wire.

In machining and assembling 248 refrigerator pistons per hour, the operations performed by the machine in-

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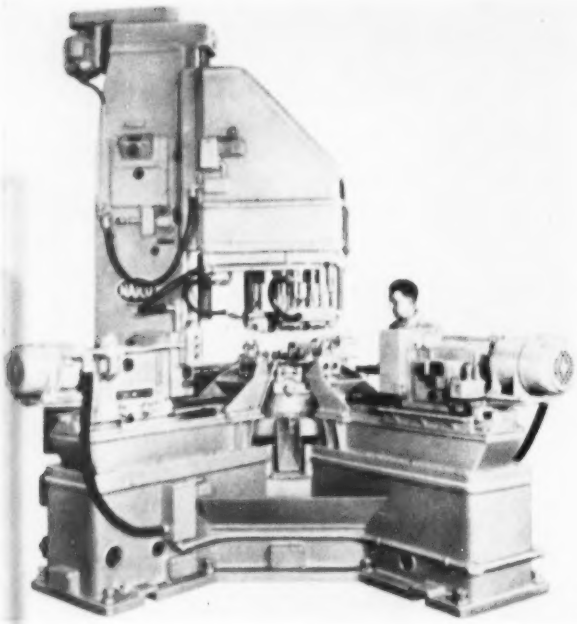
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Makers of Hand and Power Hack Saw Blades, Frames and Band Saw Blades



Four-way horizontal drilling machine equipped for machining and assembling 248 refrigerator pistons per hour

clude drilling, core drilling, facing, rough and finish reaming, chamfering, wire brushing, cutting off and inserting brazing wire, and assembling tube in piston. Operations in detail are as follows: Position No. 1—remove and load two parts with open end out; Position No. 2—(vertical head) drill ½-inch diameter for 0.766-inch ream (2 walls) Position No. 3—(vertical head) core drill for 0.766-inch ream (2 walls); (horizontal head) face open end; Position No. 4—(vertical head) rough ream for 0.766-inch ream (2 walls); Position No. 5—(vertical head) idle; (horizontal head) chamfer i.d. and o.d. of open end and ream ⅛-inch; Position No. 6—(vertical head) finish ream 0.766-inch diameter tube hole; Position No. 7—(vertical head) wire brush tube hole (horizontal head) blow chips; Position No. 8—(vertical head) idle; (horizontal head) cut off and insert brazing wire; Position No. 9—(vertical head) press in tube.

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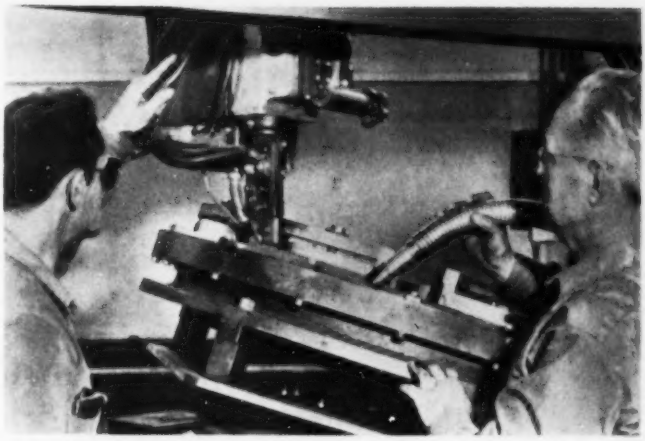
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Setup for automatically welding 18-8 stainless steel turbojet components

welds, the Solar Aircraft Company of San Diego, California, has set up a production line in which automatic hidden arc welding is used. The 18-8 stainless steel parts are welded with a standard automatic head manufactured by The Lincoln Electric Company, using an 18-8 type filler wire.

Excellent results are obtained with the welding technique worked out involving rigidly controlled high heat inputs and rigid fixtures to maintain accurate alignment of parts. The fixture is mounted on a rotating positioner which revolves the work under the welding head.



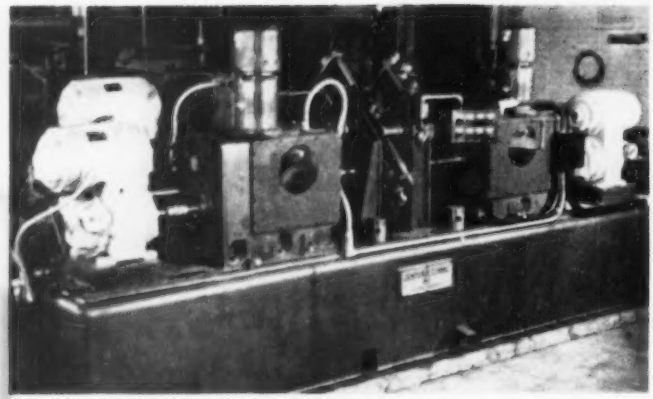
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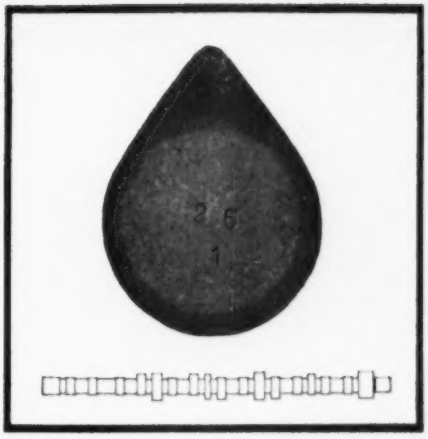


Fig. 1—Cross-section of camshaft hardened by Flamatic method shows uniform hardness pattern.

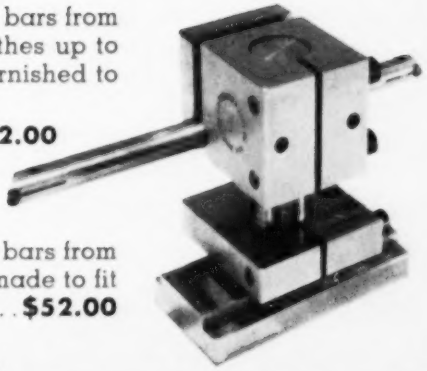
Automatic Loading Reduces Time on Flame Hardening Operation

A RECENT development in the automotive industry is the selective surface hardening of camshafts by the Flamatic method. Camshafts are now being hardened by this method on a production line basis at the rate of 10 shafts per hour per Flamatic. Distortion is low and usually no straightening is necessary before the shafts proceed to the next operation. Fig. 1 provides a cross-section of a camshaft hardened by the Flamatic method, indicating the uniform hardness pattern which is obtained with this method.

The camshafts are placed in a rack at the left end of the flame hardening machine, as shown in Fig. 2. From that point, the shafts are automatical-

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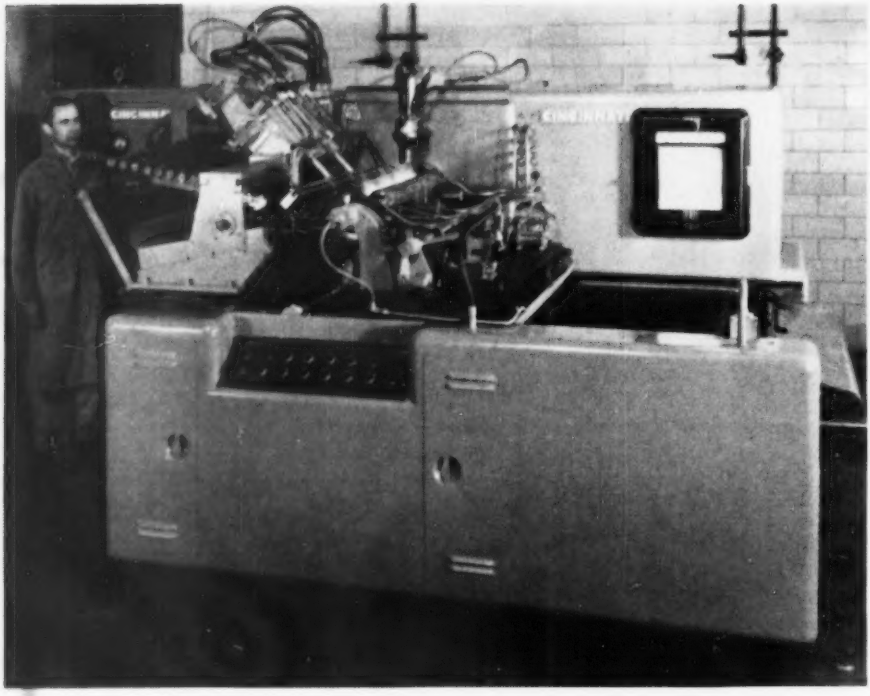


Fig. 2—Automatic loading mechanism on Flamatic selective surface hardening machine reduces time in hardening camshafts. Production averages 100 camshafts per hour.

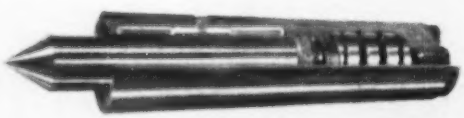
ly loaded into position between the flame heads, heated, quenched, and removed from the machine in a continuous cycle.

Fig. 3 shows a camshaft in position between centers where it has been placed by the ram of the loading mechanism. The shaft is then rotated by a motor driven spindle and heated by flame heads, as shown in Fig. 4, which are properly located so as to localize the heat in the desired area. When the

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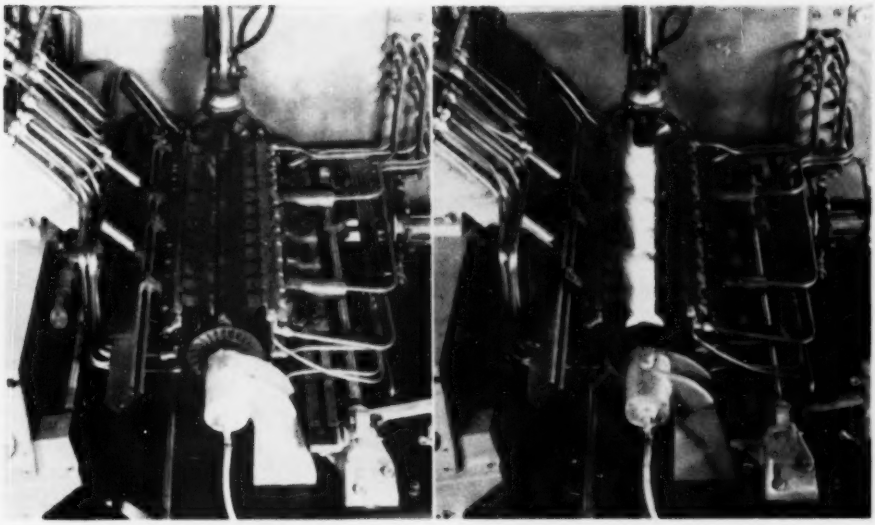


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Patent Applied for

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(Left) Fig. 3—Camshaft in position between centers where it has been placed by ram of automatic loading mechanism. (Right) Fig. 4—Flame heads are designed so as to localize heat in desired areas. A sensitive thermopile focused on the camshaft controls the duration of the heating cycle.

cam lobes reach the desired temperature, the flames are extinguished, the flame heads retract, the spindle stops rotating and retracts to allow the camshaft to be lowered, by an automatic device, into the quenching bath. As shown in Fig. 5, the shafts are removed from the quenching tank by means of a partially submerged conveyor belt.

The rapid heating cycle of the Flamatic method is the result of using oxy-acetylene or oxy-propane flames which make it possible to raise the temperature of a workpiece 500 deg. F. in one second. Just as important, however, is the accuracy of control which assures the workpiece being quenched at precisely the right temperature. This is accomplished by means of an accurate and sensitive thermopile focused directly on the



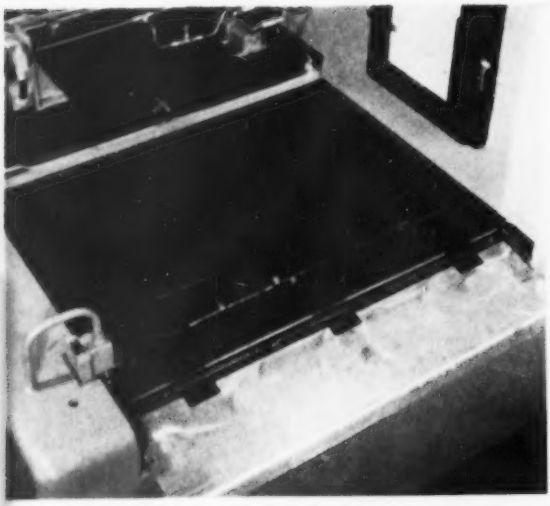


Fig. 5—Workpieces are removed from quench tank by a partially submerged conveyor belt.

workpiece, as shown in Fig. 4. The thermopile accurately measures the temperature of the workpiece. At the exact moment when the workpiece reaches the correct temperature, the thermopile causes the flames to be extinguished and workpiece to be deposited in the quenching tank. In reality, the surface temperature of the workpiece is the factor which controls the duration of the heating cycle. As a result, uniform hardness and depth of penetration are obtained on a consistent basis.

Different Material Gears Finished in Same Machine Setups

GEARS of different materials are being finished on the same machines without a change in tooling or cycle time at the new automatic washer plant of the Maytag Company in Newton, Iowa. The machines used are Michigan Tool Company 870







Four types of gears of different materials for Maytag's automatic washer are shaved to a high degree of precision on these two rotary gear finishers.

"Underpass" rotary gear finishing machines.

One machine is used to finish two mating gears, one of gray iron and one of malleable iron; the second machine is used to finish the main Formica drive gear and a steel pinion driven by a segment gear which provides the reciprocating action to the Maytag gyrator. An idea of the precision obtained on the various gears, resulting not only

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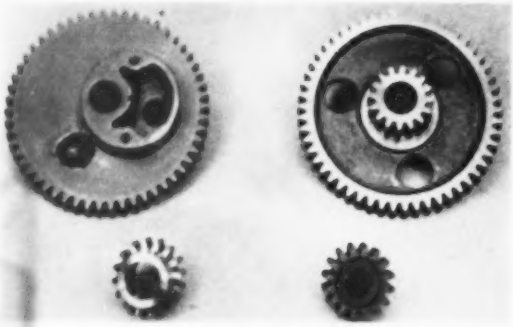
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The four gears which are shaved on the same machines with the same tools include a 4.5-inch P.D. gray iron pitman drive gear, a 4.5-inch malleable iron intermediate gear, a 1.333-inch steel pinion, and a 1.333-inch Formica main drive gear.

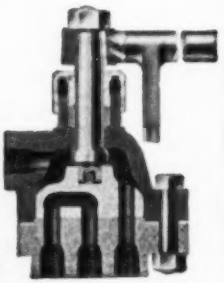
in quiet washer operation but also in long gear life, is given by the following figures:

Involute form ..... within 0.0002 inch max.
Pitch line ..... within 0.001 inch max.
Runout ..... within 0.0005 inch

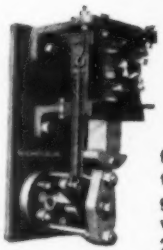
Production quantities at Maytag at the time of this writing are not such as to require the maximum output on each gear type possible on the gear finishing machines. Rather, the company has set these machines to a cycle time corresponding to the gear requiring the longest finishing time. The same cycle is used on gears which do not need as much time, avoiding the necessity of resetting the machine by shifting from one gear to another. Cutting time, nevertheless, is said to be well under one-half minute per gear on all of the various types.

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In a wide range of plants—steel, metal working, processing, etc. — Nicholson cylinder control valves have now been in constant use for over 25 years. Their capacity for longer leak-free service is confirmd by many installation records which show Nicholson valves actually become tighter with use. This is because their flat discs tend to lap themselves on the seats.



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High Production Lapping of Washers by Continuous Feed Process

THE illustration herewith shows equipment furnished by the Norton Company to a prominent automotive parts manufacturer for the continuous or through feed lapping of small brass washers. Shown at the upper left of the illustration is a hopper containing the unfinished parts which rotates and picks up the parts in slots that are so machined as to allow the parts to seat with the raised surface down. These slots will also retain the parts if the raised surface is up but selective feed determines if the parts will be allowed to pass into the feeding trough spiraling from the upper inside of the hopper. The position of the mouth of the trough is such as to allow entrance of only those parts with the raised surface down, the others being discharged back into the hopper bowl.

The selected washers then feed by gravity down the loading chute to a finger loading mechanism which is designed to prevent ganging up of the parts and individually "fingers" each washer into the empty work holder holes as they pass underneath the loading point. In the event the parts double up or fail to load in the hole properly, a finger automatically actuates a safety device, shutting off the power and stopping the machine.



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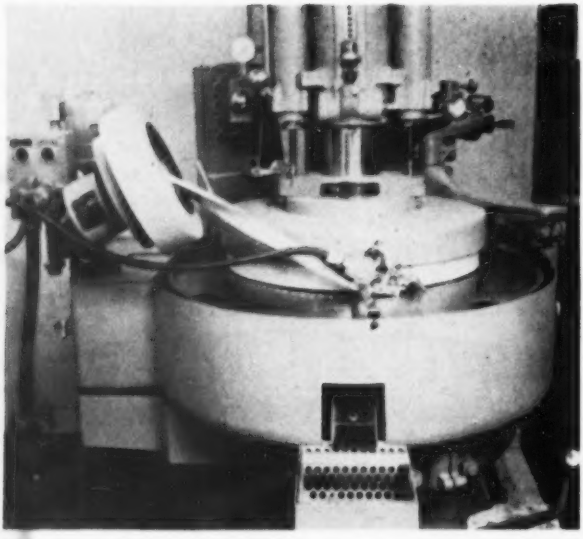
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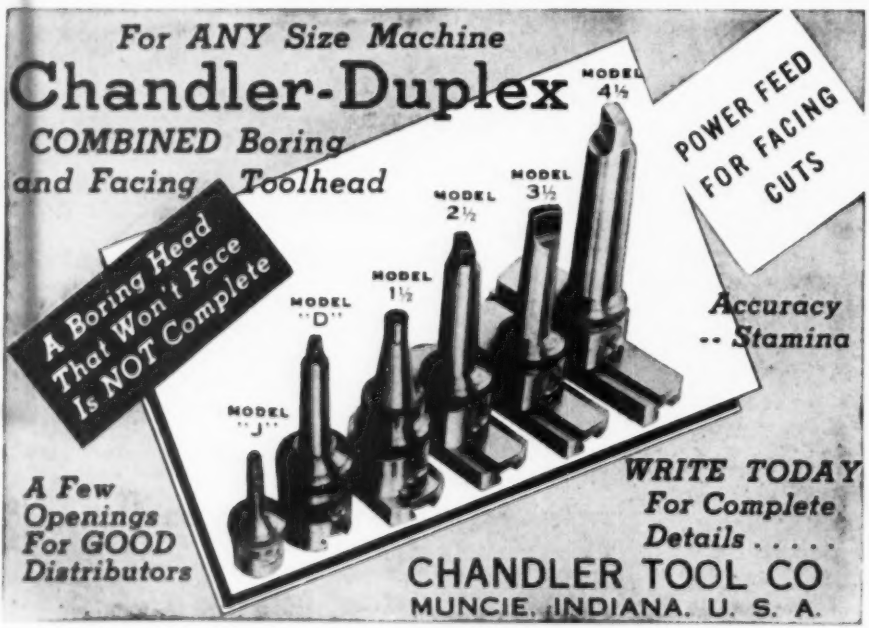
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Malleable Iron Film

Sponsored by the Malleable Founders' Society, a motion picture telling the story of malleable iron is now available free of charge from Association Films, Incorporated. Narrated by Edwin C. Hill, popular radio commentator, the three-reel 16 mm. Technicolor film, which is entitled "This Moving World," shows how the metal is made, tested, and used.

The film takes the viewer into the plants where malleable iron is made tough and ductile by a heat-conversion process and demonstrates the various properties of the metal. Recommended for showings in metal manufacturing plants, engineering societies, heavy industries, machinery manufacturing plants, automobile plants, technical schools, purchasing agents' associations, trade and vocational schools, and so on, the film may be borrowed from any one of the following Association Films exchanges: 35 W. 45th St., New York; 206 S. Michigan Ave., Chicago; 351 Turk St., San Francisco; and 1915 Live Oak St., Dallas.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



News of the Industry

Lapointe Builds New European Plant

John J. Prindiville, Jr., president of The Lapointe Machine Tool Co., Hudson, Mass., has announced the opening of a new and greatly enlarged plant of The Lapointe Machine Tool Co., Ltd., British affiliate, at Bushey, Hertfordshire, England. Replacing the former plant at nearby Edgware, the new plant is said to be one of the largest and most up-to-date in Europe devoted exclusively to the manufacture of broaching machines and broaches.

Located on a site comprising nearly three acres, the new building has 40,000 square feet of production area and has several advanced architectural features. Among these is the complete absence of columns or other obstructions, the reinforced concrete roof being supported entirely by the outer walls. The plant has fluorescent strip lighting, power cables concealed in ducts under the floor, and individually driven machines. Large size storage "tunnels" under the main production floor carry the electric and heating services, which are threaded through the roof of the tunnels at appropriate points.

The heat treating department has large gas-fired vertical furnaces which are operated by electric controls. For the comfort of the worker, air conditioning ensures a complete absence of fumes since the air is entirely changed every $12\frac{1}{2}$ minutes. Walls and ceilings have been sprayed with a washable "cement glaze" which is impervious to fumes and smoke.

R.W.M.A. Announces Prize Contest Winners

Winners of the Resistance Welder Manufacturers Association 1950 Prize Contest have been announced by the Jury of Award. In catagory No. 1, which included papers emanating from an industrial source, the first prize of



New plant of The Lapointe Machine Tool Co., Ltd., Bushey, Hertfordshire, England

$750 was awarded to a paper entitled "A Practical Method for Obtaining Consistent Resistance Welds," by J. W. Kehoe, Westinghouse Electric Corp., Pittsburgh, Pa. A. O. Bergholm, P. W. Swartz, and G. S. Hoell, all of The Franklin Institute, Philadelphia, received the second award of $500 for their paper, "Stress Distribution Around Spot Welds" The third prize of $250 was awarded to I. S. Goodman, Westinghouse Lamp Division, Bloomfield, N. J., for his paper entitled "Variables in Cross-Wire Welding of Dissimilar Metals."

Category No. 2 consisted of papers emanating from a university source, the author of which was either an instructor, graduate student, or research fellow. The first prize of $300 in this category was awarded to a paper entitled "Fatigue Tests of Spot-Welded Steel Sheets," by Dr. George Welter, Ecole Poltechnique, Montreal, Canada. W. B. Kouwenhoven and W. T. Sackett, Jr., of John Hopkins University, Baltimore, Md., received the second prize award of $200 for their paper entitled "Electrical Resistance Offered to Non-Uniform Current Flow." Category No. 3 included papers emanating from a university source, the author of which is an undergraduate student. Only one paper was submitted under this category, and, in the opinion of the jury, this paper did not qualify under the regulations set up by R. W. M. A.

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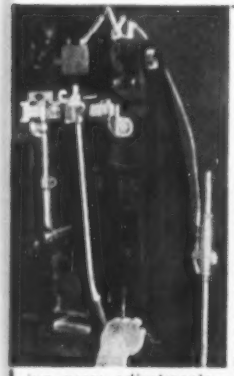
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New Ownership for Gaston Power Tools

Gaston Power Tools, Harvey, Ill., manufacturer of heavy duty grinders and polishers for the metal-working field, as well as standby generators and other equipment, has been sold by Ralph M. Gaston to new interests. The new firm is known as Gaston Power Tools, Inc., and will continue operations at 14829 Loomis St., Harvey, Ill., according to Arthur O. Backen, the company's president. Mr. Backen has annouced that sales and service facilities for the Gaston line have been greatly enlarged and improved since acquisition of the company and that wider distribution of Gaston products is currently being established.



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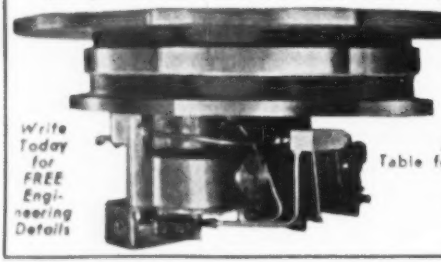
Searjeant Metal Products, Inc., Dept. B
Box 101, Mendon, N. Y.

Plant Maintenance Conference

An 18-point program of plant maintenance techniques has been set for discussion at the Plant Maintenance Conference to be held during the first three days of the Plant Maintenance Show scheduled for January 15-18 inclusive at the Public Auditorium in Cleveland, Ohio. Four general sessions will be held for all visitors and eight sectional conferences for executives and engineers with specialized problems.

General conferences will start with a discussion of preventive maintenance. On the second day, the general session will be devoted to organization and management for maintenance. On the third day, the American Society of Lubrication Engineers will conduct a panel on lubrication. Another general session devoted to plant housekeeping will take up painting and decorating, selection and upkeep of floors, and proper standards of sanitation.

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Foundry Society Honored by Trade Association Group

Gray Iron Founders' Society, national trade association of the gray iron foundry industry, was honored by the American Trade Association Executives, Washington, D. C., with the award of a certificate of merit for distinguished service by trade associations. The certificate of recognition is an annual award presented for outstanding accomplishment by A. T. A. E. to national, state, or local trade associations.

Presentation of the plaque was made by Reuel Elton, general manager of the American Trade Association Executives, to H. L. Edinger, vice president of the society, at the A. T. A. E.'s annual meeting held recently at the Hotel Somerset in Boston.

Organization of Company Standardization

To assist manufacturing concerns in the organization of their standardization work, a private five-day seminar, specially designed for company representatives, will be held from January 22 through 26, 1951, in Room 501-A, Engineering Societies' Building, New York, by Dr. John Gaillard, mechanical engineer, American Standards Association, and lecturer at Columbia University. The seminar will consist of ten conferences, each comprising a lecture by Dr. Gaillard followed by a round-table discussion of problems of interest to the conferees.

Complete details regarding the seminar, as well as information on registration, can be obtained by writing to Dr. Gaillard at 400 W. 118 St., New York 27, New York.

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C. R. Hook, Sr. Awarded Gantt Medal for Industrial Leadership

The American Management Association has announced the award of the 1950 Gantt Memorial Medal for "distinguished achievement in industrial management as a service to the community" to Charles R. Hook, Sr., chairman of the board, Armco Steel Corp., Middletown, Ohio. The medal was presented to Mr. Hook at a luncheon at the Hotel Statler, New York, during the recent A. M. A. Personnel Conference. The address of presentation was made by Thomas Roy Jones, president, ATF Inc., Elizabeth, N. J., chairman of the Gantt Medal Board of Award, which is composed of representatives of the A. M. A. and A. S. M. E.

The medal has been awarded annually since 1929 by the American Management Association and the American Society of Mechanical Engineers to commemorate the work of Henry Lawrence Gantt, pioneer management engineer

Special Monthly Cemented Carbide Meetings

Following the precedent established during the 1949-1950 session, the Detroit Chapter of the American Society of Tool Engineers has scheduled a series of monthly special meetings dealing with cemented carbides. All meetings are being held in the Rackham Building at 7:00 p. m.

Meetings already scheduled include Factors Relative to the Use of Single Point Carbide Tools (Nov. 2); Factors Relating to Tool Design, etc. (Jan. 4, 1951); High Production Machining of Steel Parts (Feb. 1); Precision Boring and Reaming with Carbides (March 1); and Milling and Carbides (April 5).

Tamms Industries Expands

Tamms Industries, Inc., has purchased the plant formerly owned by Goris & Company. The new plant, containing approximately 25,000 square feet, will afford Tamms almost twice its present Chicago space and will provide the additional facilities and convenience required to handle the company's increasing business. Two key men of the Goris organization, W. B. Boden and R. J. Tysen, have joined Tamms.

Established in 1911 as Tamms Silica Company, the operations of the firm were limited to the sales of silica and other raw materials to industry. Later the manufacture of water paints, dry colors, and sundry products was added, and last year the increased scope of the company's activities led to a change in the firm name to Tamms Industries, Inc.

Industrial Management Conference

The Fourth Annual Industrial Management Conference will be held at the University of Missouri, Columbia, Missouri, on Nov. 2, 3, and 4. Several hundred persons representing management at all levels are expected to attend the conference, which is sponsored by Associated Industries of Missouri, Society for Advancement of Management, Industrial Council of Kansas City, Industrial Relations Club of St. Louis, and the Chamber of Commerce of Kansas City.

After a welcoming address by University President Frederick A. Middlebush at a luncheon on Thursday, Nov. 2, the conference will be devoted to a series of panels, addresses, and seminars. Complete information can be obtained by writing to Industrial Management Conference, 107 B. & P. A. Building, Columbia, Missouri.

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Cincinnati Milling Expands Operations

The Cincinnati Milling Machine Co., Cincinnati, Ohio, manufacturer of milling, broaching, lapping, and other machines, has announced three expansion programs of interest to American industry. Carlisle Chemical Works, Incorporated, a subsidiary of Cincinnati Milling, has moved to a new plant in Reading, Ohio. A new division—Cincinnati Milling Products Division—is now selling the new Cincinnati grinding wheels, as well as Cimcool cutting fluid. Both products are made in a plant which was completed in May 1949 and is now being enlarged.

The increased line of machine tools now being produced by Cincinnati Milling has resulted in a considerable reduction in the amount of working space available in the company's main plants. Since recreation fields and parking lots will be retained for the benefit of employees, the company has decided to build a new plant within easy reach of Cincinnati on a site just outside of Wilmington, Ohio.

Minnesota Mining to Construct Branch Warehouse

The Minnesota Mining & Mfg. Co., St. Paul, Minn., manufacturer of pressure-sensitive adhesive tapes, coated abrasives, adhesives, industrial coatings and chemicals, and other products, has announced plans for the construction of a $250,000 branch warehouse and office building on Elmwood Ave. near W. 117th St., Cleveland Ohio. The one-story steel and masonry structure will contain 30,000 square feet floor space with outside dimensions of 150 x 200 feet. The building is scheduled for completion about Jan. 1.

Joseph L. Kopf Elected President of Metal Trades Association

Joseph L. Kopf, president of Jabez Burns & Sons, Inc., New York, was elected president of the National Metal Trades Association at the recent three-day 51st Annual Convention of the association held at the Hotel Commodore. Mr. Kopf is a past president of the New York and New Jersey branch of the association and was formerly first vice president of the national body. He is also treasurer of the American Society of Mechanical Engineers.

Other officers elected were Philip M. Morgan, president of Morgan Construction Co., Worcester, Mass., first vice president, and Charles S. Craigmile, president of Belden Mfg. Co., Chicago, Ill., second vice president and treasurer. Elected to the Administrative Council were Ernest F. Stockwell, John E. Echlin, Norman L. Rowe, W. R. Daniels, J. E. O'Brien, Donald D. Burdett, Robert T. Skilliter, L. M. Dexter, R. G. Wilson, Walter F. Newhouse, T. J. Morton, Jr., L. H. Schrade, A. F. Shafter, H. M. Ramel, and Lawson Adams.

Charles Bruning Company to Build Million Dollar Plant

The Charles Bruning Co., Inc., New York, N. Y., manufacturer of blueprint and whiteprint papers and machines, drafting equipment, and technical photographic products, has announced plans for erecting a million dollar plant at the Bergen County Industrial Terminal, Teterboro, N. J. The plant will be located on a 10-acre plot on the corner of North and Huyler Streets in the Teterboro section of the Terminal. The building, comprising 120,000



square feet, will be of the one-story brick and steel modern industrial type with air conditioning. Executive offices and laboratories will be located in a two-story section of the building. Freight transportation will be handled by a railroad siding.

The new plant will centralize the eastern manufacturing of the company, in addition to housing the research organization and the executive offices. Personnel will total approximately 200 persons. Preliminary excavations are already under way, and the new plant is expected to be in operation within a year.

A. L. Gutterson Elected President of Lovejoy Tool Company

The directors of the Lovejoy Tool Co., Inc., Springfield, Vt., have announced the election of Albert L. Gutterson as president of the company. Mr. Gutterson was graduated from the University of Vermont in 1912 with a bachelor of science degree in engineering. He was formerly associated with the Fellows Gear Shaper Company and later with the Jones & Lamson Machine Company where he became a sales engineer. Mr. Gutterson also held the positions of assistant chief engineer and sales manager at the Gilbert & Barker Manufacturing Company, a subsidiary of The Standard Oil Company of New Jersey. For the past few years he acted as manufacturers agent in Vermont and New Hampshire for concerns manufacturing equipment used by the petroleum industry.

Lovejoy Tool has also announced the election of George A. Perry as a director, succeeding the late Charles N. Safford.







Materials Handling Conference

An extensive discussion of materials handling problems has been announced for the Materials Handling Conference to be held at the International Amphitheatre, Chicago. The conference will be conducted during three of the five days of the 4th National Materials Handling Exposition, April 30 to May 4 inclusive.

The conference will be sponsored by the American Material Handling Society and the exposition by the Material Handling Institute. Unique features of the conference will include sponsorship of portion of the program by the society's regional chapters and separate sessions devoted to industries with special problems. The exposition will add a huge outdoor arena to its exhibit space in order to permit demonstrations of yard handling equipment.

The conference will devote its three morning sessions to the consideration of general problems. These will include building of materials handling systems; surveying materials handling problems; relating handling to other departments; determining handling costs; and presenting a materials handling program to top management. Afternoon sessions will consider special problems of separate industries. Two sessions will run con-

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(Left to Right) A. L. Carr, C. F. Myers, and S. B. Lindh

currently each day. There will be no charge for admission to either the conference or the exposition.

Changes in Morse Twist Drill Personnel

J. Y. Scott, president of Morse Twist Drill & Machine Co., New Bedford, Mass., has announced the appointment of A. L. Carr to succeed J. C. Kuhn as vice president and director of sales. Mr. Kuhn, who has held the latter position since 1948, has retired to Florida from active business life.

C. F. Myers, formerly midwest district manager, has been appointed to the position of sales manager. S. B. Lindh will continue his activities as assistant sales manager.

Gray Iron Founders' Society Presents Awards at Annual Meeting

Arthur W. Palm, sales representative, Olney Foundry Division, Link-



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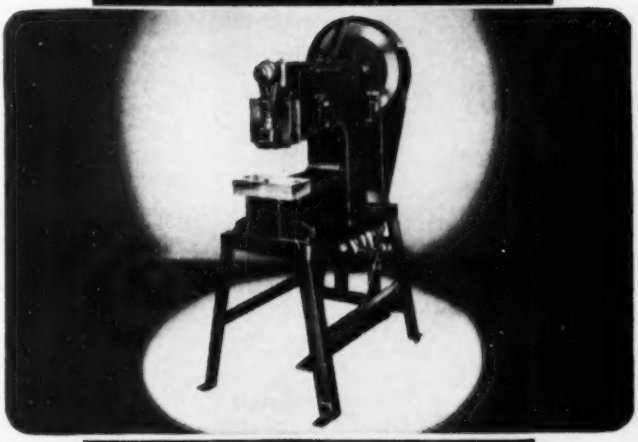
Established 1900

Belt Co., Philadelphia, Pa., was awarded first prize in a redesign competition sponsored by the Gray Iron Founders' Society, Inc., Cleveland, Ohio. Second place in the contest went to R. A. Bogardus and J. D. James, chief of calculation department and superintendent respectively of the Grove City Foundry of Cooper-Bessemer Corp., Grove City, Pennsylvania.

The awards were the first to be given under the society's newly established industry-wide contest to determine the most significant and outstanding examples of where foundry engineers have redesigned a part or component for production as a casting in place of some other type of construction. Presentation of the awards were made at the society's twenty second annual meeting which was held recently at the Netherland Plaza Hotel in Cincinnati, Ohio.

Also honored at this annual meeting was Oliver Smalley, president of the Meehanite Metals Corp., New Rochelle, N. Y., who was presented with the society's gold medal award for his outstanding contribution to the scientific advancement of the industry. Mr. Smalley was cited by the Gray Iron Founders' Society for the award by reason of his pioneering work as the first technical director of the society, for brilliant work to enhance the quality of gray iron castings, and his

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Export Corporation Organized

The organization of two export corporations to operate as "Thor" sales and service branches in western Europe and South America has been announced by Neil C. Hurley, Jr., president, Independent Pneumatic Tool Co., Aurora, Ill., manufacturer of portable power tools. In western Europe, the new corporation, Thor Tool Continental, Incorporated, is located in Antwerp, Belgium, and operating under the direction of Vance G. Turner who, for the past three years, has been Thor western Europe export representative with headquarters in Brussels.

Thor Tool Hemisphere, Incorporated is the name of the new South America corporation located in Sao Paulo, Brazil. Donald E. Randall, newly appointed manager, will supervise Thor sales and service throughout South America from the new headquarters.



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Cam Miling Facilities Acquired

The Blair Tool & Machine Corp., College Point, N. Y., recently acquired the entire cam milling facilities of the Daly Machine & Tool Works, Newark, N. J. The Daly machines supplement existing Rowbottom equipment, enabling Blair to offer a versatile cam cutting service for both large and small cams.

Non-Gran Offers Larger Centrifugal Castings

New equipment to produce larger sizes has been added to the centri-

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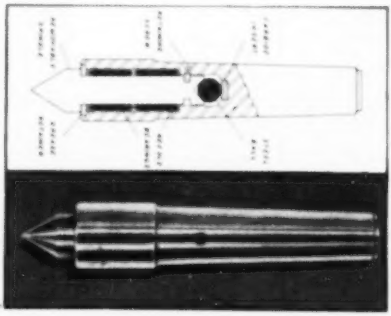




Illustration showing typical Non-Gran centrifugal castings

fugal casting department at American Non-Gran Bronze Co., Berwyn, Pa. The company now offers centrifugally cast liners, sleeves, rolls, rings, bushings, and so on, in bronze alloys—rough or machined—up to 12 inches o.d. and 13 inches in length.

A. I. E. E. Machine Tool Conference

The 1950 technical conference on electrical engineering in the machine tool industry will be held November 14-16 in the Sheraton Hotel, Worcester, Mass. The conference will include three technical sessions and two plant visitation programs providing for trips to machine tool plants in the Springfield, Vermont area.

The conference is being conducted by the Machine Tool Committee of the American Institue of Electrical Engineers, committee on general industry applications in conjunction with the Worcester section of the institute. Persons planning to attend the conference are urged to write to G. R. Blake, Westinghouse Electric Corp., 507 Main St., Worcester 8, Mass., to obtain registration material and other information.

B-R-E-A-K....

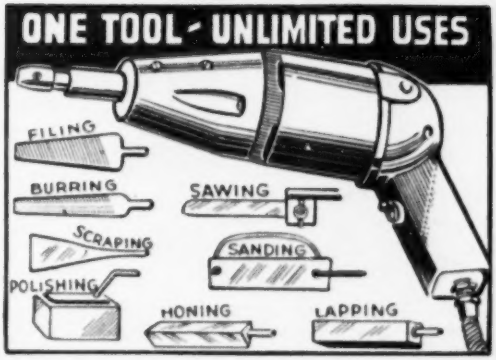
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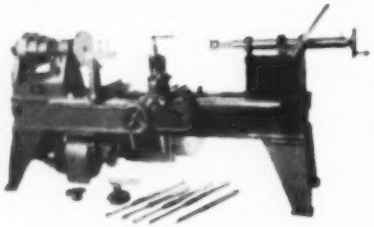
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Producto Opens New Warehouse and Assembly Plant

The Producto Machine Co., Bridgeport, Conn., has announced the opening of a new warehouse and assembly plant at 3632 Delphos Ave., Dayton 7, Ohio. The new warehouse is equipped to stock, assemble, and distribute die sets in the South Central industrial area. Neil Griest, branch manager of the Producto Dayton office, is responsible for both assembly and sales and will be assisted by Robert Whaley. A complete line of tool and diemakers' supplies is immediately available from the new warehouse.

H. K. Porter Acquires Connors Steel Company

In a move to further diversify its manufacturing operations, H. K. Porter Co., Inc., Pittsburgh, Pa., has acquired the Connors Steel Co., Inc., Birmingham, Ala., producer of electric furnace steel and steel products. The Connors Steel Company, one of the South's leading manufacturers of light steel products, produces steel billets from scrap by the electric furnace method and operates a series of rolling mills to manufacture finished products. The plant's total capacity exceeds 94,000 tons yearly.

For further information on any product mentioned in this issue—use the READER SERVICE CARD between the covers.

Did You Know?...

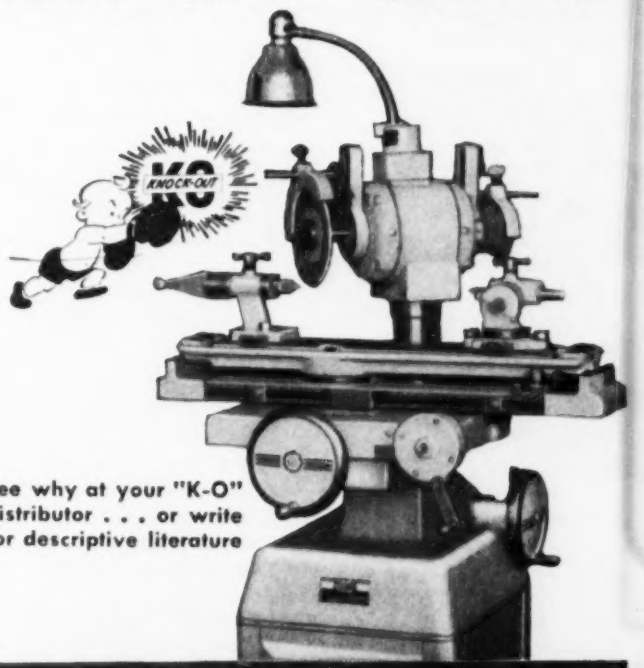
Sier-Bath Gear and Pump Co., North Bergen, N. J., has appointed the following companies as representatives for its gear coupling: **J. R. Ruddock & Assoc.,** 7001 N. Clark St., Chicago 26, Ill., for north-eastern Illinois, including the Chicago metropolitan area (bordering counties in Michigan); **Volco Co.,** 622 McKnight Bldg., Minneapolis 1, Minn., for the states of Minnesota, Iowa, South Dakota, North Dakota, Northwestern Illinois, and Peninsula of Michigan; and **W. B. Conrad Co.,** 506 Curtiss Bldg., Detroit 2, Mich., for southeastern Michigan.

—o—

The Durant Mfg. Co., Milwaukee, Wis., manufacturer of counting and measuring machines, has announced the appointment of **Harold V. Barker** as branch manager of its new southern branch office at Greenville, South Carolina.

Paul Jones, president of Cummins Portable Tools, Chicago, has announced the purchase of the assets of **Fred W. Wappat, Inc.,** Mayville, N. Y., manufacturer of portable electric hand saws. The newly acquired property will be operated by Cummins as the Fred W. Wappat Division, and the entire Wappat personnel and identity of the Wappat line will be retained.

There's a reason . . . 85% of all popularly-priced Tool and Cutter Grinders sold are *"Knock-outs"*



See why at your "K-O" distributor . . . or write for descriptive literature

K. O. LEE CO.
ABERDEEN, SOUTH DAKOTA

Did You Know?...

Construction has been completed by the **Mid-West Abrasive Company** on an additional manufacturing plant in Owosso, Michigan.

— o —

H. H. Jason has been appointed manager of tool sales and **J. D. Kennedy** manager of wear parts sales for the Carboloy Co., Inc., Detroit, Michigan.

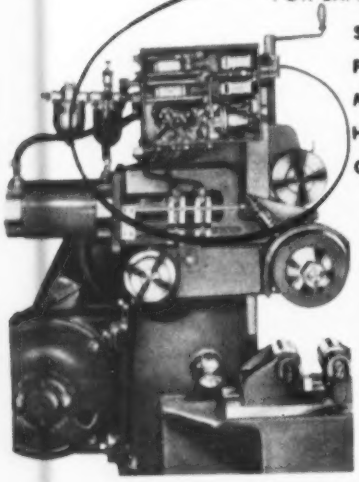
Ralph G. Lagerfeldt, formerly vice president in charge of sales for the Colonial Broach Co., Detroit, Mich., has been named executive vice president. **Harry Gotberg,** formerly chief engineer, has been named vice president and will also supervise sales engineering, experimental engineering and estimating. **William Kukuk** has been appointed factory manager. **Ben F. Welte,** formerly assistant chief engineer, has been advanced to chief engineer, with **Glen Harmon** as assistant chief engineer. **Hans Reitz** has been named superintendent of machine construction.

— o —

The Foxboro Co., Foxboro, Mass., manufacturer of industrial instruments for measurement and control, has opened a branch office at 214 W. 10th St., Wilmington 1, Del., under the managership of **Kenneth L. Barton.** Earlier this year, the company opened a branch office at 225 S. 5th St., Minneapolis 2, Minn., with **Robert C. Cahill** as resident manager.

1 PUT NEW SELLING POWER IN YOUR PRODUCT!
2 INCREASE YOUR PRODUCTION EFFICIENCY!
with Revolutionary HI-CYCLIC AIR VALVES

FOR EXAMPLE:
STEEN HIGH SPEED PIPE & TUBE CUT-OFF MACHINES NOW FEATURE HI-CYCLIC VALVE-OPERATED CUTTER ATTACHMENTS



Continental Machine Company, Chicago, has greatly increased the productivity of Steen Pipe & Tube Cut-Off Machines by using Hi-Cyclic Air Valves to operate the cutter. Here's how: When operator steps on foot switch, air cylinder makes a *fast* approach of the blade to the pipe. There's a *split second slow-down* to allow the blade to make *gentle contact* with the pipe and start revolving it—*then,* steady, powerful pressure is applied, cutting the pipe at high speed. Every action is *completely* controlled — *without hydraulic checks*—by the Beckett Hi-Cyclic Air Valves!

Hi-Cyclic Air Valves provide *absolute control of air power!* Investigate this new development in air engineering. Write for bulletin describing Beckett Hi-Cyclic Basic, Single and Double Solenoid, Piloted and Hydraulic Valves.

BECKETT-HARCUM CO., 1142 Wayne Rd., Wilmington, O.

Did You Know?...

Ward Leonard Electric Co., Mt. Vernon, N. Y., manufacturer of electric controls, has announced the appointment of **Jesse W. Eakins Co.,** 3105 E. Grand Blvd., Detroit 2, Mich., as sales representative in the Detroit area.

— o —

The Harnischfeger Corp., Milwaukee, Wis., has announced the appointment of **Ervin C. Brekelbaum** as vice president in charge of engineering. Mr. Brekelbaum was formerly the executive chief engineer of the company.

— o —

William A. Bohlander, previously associated with Aetna Standard Engineering Company as superintendent, has been appointed factory manager of The Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.

The board of directors of Chase Brass & Copper Co., Inc., Waterbury, Conn., have elected President **Robert L. Coe** to the position of chairman of the board and **Richard C. Diehl,** former general manager of the Steubenville, Ohio plants of Wheeling Steel Corporation, to the position of president.

— o —

Joseph A. Horne, chairman of the board of directors of The Yale & Towne Manufacturing Company, died recently in his 82nd year after a brief illness.

— o —

Buckeye Tools Corp., Dayton Ohio, manufacturer of portable air and electric tools, has signed contracts with the Joy Mfg. Co., Pittsburgh, Pa., and Joy Mfg. Co. (Canada) Ltd., Ontario, covering sales and service on Buckeye portable air tools in export markets.

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LOW PRICED
•
PORTABLE
SELF-CONTAINED
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READY TO WORK
Angle Cutting Vise
STURDY
ECONOMICAL

Write for Bulletin No. 300

MILLER-KNUTH MFG. CO. OMAHA, NEB.

Did You Know?...

T. Embury Jones, president, Precision Welder & Machine Co., Cincinnati, Ohio, has announced the appointment of three new representatives. **Interstate Welding Supply Co.**, 37 Hurley St., Cambridge, Mass., will cover eastern Massachusetts and Rhode Island; **Arcos Corp.**, 436 Capital Ave., Hartford, Conn., will cover Connecticut and western Massachusetts; and **Welding Sales Corp.**, 40 Globe St., Newark, N. J., will cover northern New Jersey and metropolitan New York.

—o—

The retirement of **Ellis H. Jones** as general manager of the Canadian Division of The Yale and Towne Manufacturing Company after 57 years of service and the appointment of **George L. Dirks** to succeed him has been announced by Gilbert W. Chapman, president of the company.

—o—

Diamond Machine Tool Co., Los Angeles, Calif., manufacturer of precision metal-working machinery, has announced the reappointment of J. K. Sutherland to the position of sales manager of the company.

—o—

Marvel Tool & Machine Co., 1096 N. River Rd., St. Clair, Mich., has announced reduction in prices from 12 to 15 per cent on its complete line "Marveco" live centers. New prices are retroactive to October 15, 1950.

Staples TOOLS

Pay Dividends in Top Performance

Users of Staples Carbide Cutting Tools reap profits from higher work output per tool and longer tool life. They know that Staples quality is never cheapened to meet a price.

You can get *immediate* delivery from a standing stock of over 28,000 standard Staples carbide-tipped circular and single point tools.

If your requirements for special tools are slight alterations of standard tools, Staples can meet your special requirements and ship within several days.



- Tell us your requirements.
- Send for complete tool catalog.

THE STAPLES TOOL COMPANY, Cincinnati 25, Ohio

Staples — Distributors in Major Cities — CARBIDE-TIPPED CUTTING TOOLS

A COMPLETE LINE OF SINGLE AND MULTIPLE POINT CUTTING TOOLS — EXPANSION REAMERS — FORM TOOLS — CENTERS — MASONRY DRILLS — SPECIAL TOOLS

Did You Know?...

The Carborundum Co., Niagara Falls, N. Y., has announced the appointment of **John A. Decker** as sales manager for the New York district and **William J. Kingsley** as assistant sales manager of the Bonded Products and Grain Division, with headquarters in Niagara Falls. Mr. Decker has been with the company for 17 years, while Mr. Kingsley is a veteran with 28 years of service.

— o —

L. G. Firth, vice president in charge of research and development, Firth Sterling Steel & Carbide Corporation, has announced the appointment of **Walther L. Havekotte** as assistant manager of research. Mr. Havekotte has worked extensively with high-temperature alloys for the past few years at the Battelle Memorial Institute, Columbus, Ohio.

The Westcott Chuck Co., Oneida, N. Y., has announced the appointment of the **Norman Durrie Sales Co.**, 605 W. Washington Blvd., Chicago, Ill., as its district representative in northern Illinois, northern Indiana, eastern Iowa, eastern Wisconsin, and the upper peninsula of Michigan.

— o —

Earl R. Mellen, president, Weston Electrical Instrument Co., Newark, N. J., has announced the appointment of **James J. Hagan** as assistant plant manager. Mr. Hagan joined the Weston organization in 1942 as a time study engineer.

— o —

Abart Gear and Machine Co., Chicago, Ill., has announced the appointment of **O. W. Klima** as chief engineer. Since graduating from Armour Institute of Technology, Mr. Klima has specialized in power transmission equipment and machine design.



Did You Know?...

Fred P. Biggs has been appointed president of the Brake Shoe and Castings Division and **Stephen S. Conway** has been appointed vice president in charge of sales of the Brake Shoe and Castings and Southern Wheel Division, according to an announcement made by Maurice N. Trainer, president of American Brake Shoe Company.

M. O. Walker, formerly process engineer with the Coated Products Division of the Carborundum Company, has been named chief chemist of the Michigan Abrasive Co., Detroit, Mich., according to Max C. Jones, president.

— o —

Kennametal Inc., Latrobe, Pa., has appointed **William Bruun** as representative in the midwestern district, working out of the Chicago office at 5830 West 26th St. **F. O. Hill** has been appointed as service engineer in the Cincinnati district, working out of the Cincinnati office at 2162 Gilbert Ave. The Kennametal district office address in Indianapolis has been changed to Room 620, Board of Trade Building, 143 N. Meridian St., Indianapolis 4, Indiana.

— o —

The office of the **Resistance Welder Manufacturers Association** has been moved from 505 Arch Street, Philadelphia, to new quarters located at 1900 Arch Street. The new quarters were extensively remodeled prior to its occupancy.



Did You Know?...

According to Edward B. Nisbet, president of Laminated Shim Co., Inc., Glenbrook, Conn., **Richard Seipt,** who has been serving as vice president in charge of sales for 10 years, will function in the future as vice president and general manager. **Merle L. Lockwood** has been appointed vice president in charge of sales to succeed Mr. Seipt. **Michael E. Errico,** formerly assistant sales manager, has been named sales manager of the company.

— o —

C. S. Allen, formerly vice president and general manager of the A. O. Smith Electrical Mfg. Co., Los Angeles, Calif., has been appointed general manager of the Star Kimble Motor Division of Miehle Printing Press and Mfg. Co., Bloomfield, New Jersey.

— o —

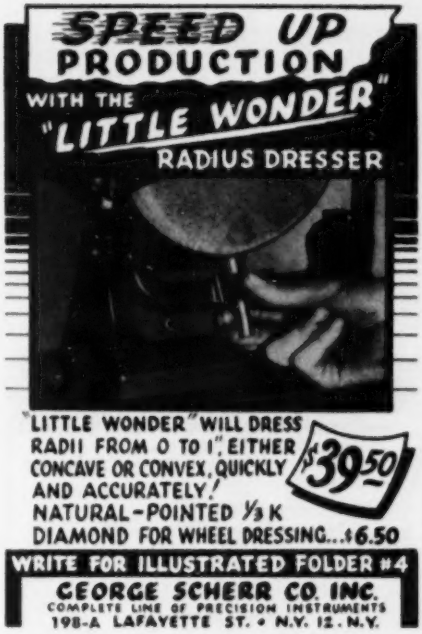
Walter Donnelly, formerly associated with Sterling Engine Works, Buffalo, N. Y., has been appointed works manager of The Tomkins-Johnson Co., Jackson, Mich., where he will supervise production of the company's lines of air and hydraulic cylinders, riveters, clinchers, diesinking milling cutters, and air controls.

— o —

W. B. Horton, welding engineer for Lincoln Electric Company in Chicago, Ill., died recently at the age of 53. Mr. Horton started with Lincoln in 1929.

— o —

Carl F. Herbold, formerly manager of industrial relations at Westinghouse Electric Corporation's Small Motor Division at Lima, Ohio, has been appointed to the position of director of manufacturing planning. **K. H. Smith,** assistant manager of industrial relations, has been named to fill the position vacated by Mr. Herbold.





Did You Know?...

Crobalt Inc., Ann Arbor, Mich., has announced the appointment of **Chester M. Adams** as vice president in charge of production and research. In his new position, Mr. Adams will be responsible for the manufacture of Crobalt cutting tools and development of cast alloys for metal-working and other industrial applications.

Appointment of **Roger S. Ahlbrandt** to the newly created position of manager of stainless steel bar sales for the Allegheny Ludlum Steel Corp., Pittsburgh, Pa., has been announced by Russell M. Allen, vice president in charge of sales. **I. R. Leheny** has been appointed to the position of sales manager of cutting tool sales, succeeding Mr. Ahlbrandt.

— o —

The appointment of **P. L. Edwards** as manager of its central district office in Pittsburgh has been announced by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J. Mr. Edwards succeeds **R. C. Rice,** who has retired from active service with the company.

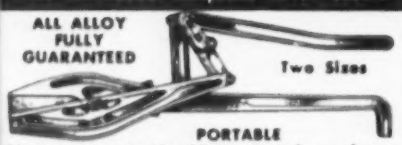
— o —

A. Oakleigh Bush, chief sales engineer of the Abrasive Division of Norton Co., Worcester, Mass., died recently at his home. Mr. Bush had been with Norton since 1924.

— o —

Robert Paxton has been appointed manager of manufacturing policy for the General Electric Company and has also been elected a vice president by the G-E board of directors. **James M. Crawford** succeeds Mr. Paxton as manager of the Transformer and Allied Product Divisions of the G-E Apparatus Department.

BREMIL
The IMPROVED Compound Lever Shears



No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to ¼" steel plate.
BREMIL MFG. CO.
1400 Pittsburgh Ave., Erie, Pa.

STANDARD D - 4 Abrasive Band Grinder

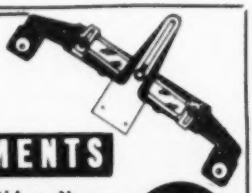


This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built o machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36¼" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.
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Quick Shipment on
TAPER ATTACHMENTS



For All Lathes—Old or New—
9" to 24" Swing
Write for Bulletin
MASTER - TAPER COMPANY
4531 N. Beacon St., Chicago 40
Excl. Mfrs. of Taper Attachments

$29.50 to $149.50

Did You Know?...

Clifford G. Garrett, 633 E. 38th St., Indianapolis, Ind., has been appointed sales representative in the Indiana territory for the Kingsbury Machine Tool Corp., Keene, N. H., builder of automatic drilling and tapping machines.

—o—

Hauser Machine Tool Corp., 30 Park Ave., Manhasset, N. Y. has been appointed exclusive U. S. representative for Leo Hjort Co., Copenhagen, Denmark, manufacturer of keyless self-centering drill chucks.

—o—

E. B. Sewall Mfg. Co., St. Paul, Minn., has announced the establishment of a branch at 570 W. Randolph St., Chicago 6, Ill., where a complete stock of roller chain sprockets in standard sizes will be maintained.

—o—

Louis M. Teich has been appointed branch manager of the Philadelphia office and warehouse of the Latrobe Electric Steel Company. Mr. Teich was formerly a salesman for the company in the Philadelphia area.

—o—

William F. Winemiller, formerly refractories engineer in the Detroit area, has been named chief sales engineer of the Refractories Division of Norton Co., Worcester, Mass. **Eugene A. Fischer** has been appointed refractories engineer for New England and part of New York State. **Murner E. Thor** will take over the territory consisting of eastern Canada and part of New York State. **David G. Bolon** has been named refractories engineer for the territory which includes the principal part of Indiana and the state of Michigan with the exception of the upper peninsula.



To give socket screw users the ultimate in strength, Brighton Nu-Process goes deep! In an entirely new metal working process, specially selected alloy steel is formed into screws with *continuous unbroken fibers* and *fine, compact grain.* This greater strength allows greater hardness, resulting in top quality socket screw products.

A complete stock of Brighton Nu-Process Socket Screw Products is carried for your convenience by progressive distributors in most localities. If your favorite mill supply house cannot furnish them, write for the name of your nearest distributor.

GET THE FACTS — WRITE FOR YOUR COPY OF NEW CATALOG TODAY

BRIGHTON

Screw & Manufacturing Co.

Reading Road at Dorchester
Cincinnati 2, Ohio



MODEL JA
50,000 R.P.M.
Weight 12 ounces; length 6¼ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

$42
IN U.S.A.

THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding . . . not only when the grinder runs idle. It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind . . . not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.
208 Waubesa St. Madison 10, Wis., U. S. A.

Write for KIPP Air Tool Catalog AT 3006

Did You Know?...

Elton E. Staples, manager of the Cleveland district office of Hevi Duty Electric Co., Milwaukee, Wis., has been elected a vice president. Mr. Staples will continue to head the Cleveland office and supervise generally the activities of all field sales offices of the company.

—o—

J. K. Hodnette, vice president and general manager of industrial products for Westinghouse Electric Corp., Pittsburgh, Pa., has announced the appointment of **L. R. Ludwig** as assistant to the vice president. Formerly manager of the Westinghouse Motor and Control Division in Buffalo, N. Y., Mr. Ludwig is assigned responsibility for product development.

—o—

Appointment of **S. B. Strom** to the newly established post of comptroller of Carboloy Company, Inc., Detroit, has been announced by K. R. Beardslee, president. Since 1943 Mr. Strom has been assistant to the president and, in his new position, also will continue to act in the same general capacity.

—o—

Reltool Corp., Milwaukee, Wis., manufacturer of material cutting tools, has annouced the appointment of the **Lyman B. Warren Co.,** St. Paul, Minn., as representative in upper Michigan, western Wisconsin, Minnesota, North and South Dakota, and Nebraska.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.



Richard E. LeBlond



Fred'k. S. Blackall, Jr.



Swan E. Bergstrom

National Machine Tool Builders Elect New Officers At Annual Meeting

RICHARD E. LeBlond, president of The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, is the new president of The National Machine Tool Builders' Association, following his election at its 49th Annual Meeting held in Toronto, Canada, on October 11, 12, and 13.

Frederick S. Blackall, Jr., president of The Taft-Peirce Mfg. Co., Woonsocket, R. I., and Swan E. Bergstrom, vice president of The Cincinnati Milling Machine Co., Cincinnati, Ohio, were elected first and second vice presidents, respectively. Jerome A. Raterman, president of The Monarch Machine Tool Co., Sidney, Ohio, was elected treasurer.

Three new directors were also elected. They are Mr. Bergstrom, Edward W. Miller, president of The Fellows Gear Shaper Co., Springfield, Vt., and Francis J. Trecker, president of Kearney & Trecker Corp., Milwaukee, Wisconsin.

Tell Berna continues as general manager and Mrs. Frida F. Selbert was again named secretary.



Jerome A. Raterman



Edward W. Miller



Francis J. Trecker

Book Reviews

Proceedings of Sixth Annual Meeting of Metal Powder Association. Published by Metal Powder Association, 420 Lexington Ave., New York 17, N. Y. 92 pages. Price, $2.50.

This booklet contains all the formal papers of the Metal Powder Association's sixth annual meeting held recently in Detroit, with discussions and the transcript of an interesting informal discussion on powder metallurgy. A new type of stainless steel powder, application of iron powder in radio and television circuits, and the market outlook for metal powders are among the subjects covered in the booklet. Other papers, all presented by authorities in the field and included in the proceedings, deal with cost accounting for powder metallurgy, thermochemical coated metal powders, metal powder parts as friction material, and other topics of interest to the executive, as well as to the engineer.

The titles of the papers contained in the booklet and the names of the authors are as follows: "Thermochemical Coated Metal Powders," by J. E. Drapeau, Jr., Metals Refining Company; "Cost Accounting with Reference to Powder Metallurgy Products," by A. J. Langhammer, Amplex Manufacturing Company; "Application of Iron Powder in Radio and Television Circuits," by F. W. Edwards, Standard Coil Products Company, Inc.; "A New Type of Stainless Powder," by G. Stern, American Electro Metal Corporation; "The Use of Metal Powder Parts as Friction Material," by L. P. Kane, S. K. Wellman Company; and "Metal Powders in a Competitive Market," by John Sasso, "Business Week."

FOR SMALL

JIG BORING

PUT SMALL JOBS ON THIS

LINLEY MACHINE



and save your larger machines for heavier work.

YOU'LL BE SURPRISED!

at the extremely low first cost and the vitally important jobs that this little precision machine can do. It will pay you to get our accuracy information on this machine which has 6" x 10" table movement and 7" x 17½" table size.

Write TODAY For Bulletin J

LINLEY BROS. COMPANY

663 State St. Ext.
Bridgeport 1, Conn.

TO INCREASE PRODUCTION AND TO IMPROVE EFFICIENCY USE

BUTTERFLY FILING AND DIE MAKING MACHINES

This is a powerful machine for heavy or small precision work in use all over the world. Airplane Factories, Ammunition Plants, Toolrooms where fast production is desired. 4 Models, No. 16, No. 14 "EL" and Model "D". The larger the Model, the bigger the stroke and therefore more filing is performed. Furnished with or without pedestals. *Constructed as per specifications of U. S. Naval Aircraft Factories.*

HARVEY MFG. CORP.

161 Grand St., New York, Phone Canal 6-5170



BEWARE OF IMITATIONS

Our machine carries the Butterfly trade mark.

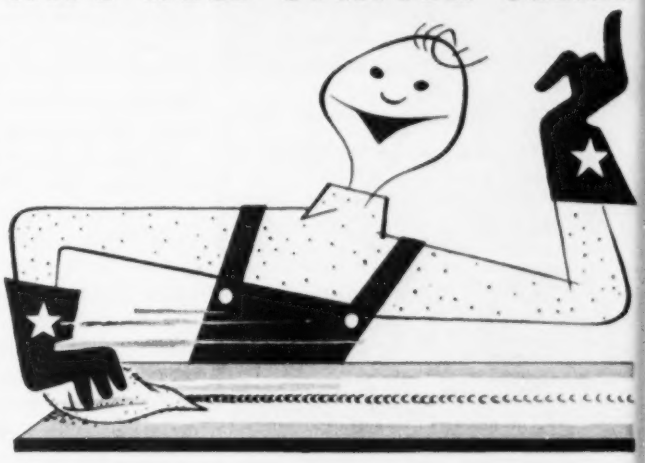
Registered U.S. Patent Office

Improving Management Communication (General Management Series No. 145). Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 32 pages, paper covers, Price, 75 cents.

This booklet, comprised of papers which were presented at the West Coast General Management Conference of A.M.A. held at the Hotel St. Francis in San Francisco, deals with a series of case reports on improving management communication. The new importance of communication, maintaining communication in a decentralized company, attitude surveys as a tool of management, and communicating with employees on benefit plans are the subjects which are fully treated in the booklet. The papers were prepared by A. C. Beeson, director of industrial relations, Food Machinery & Chemical Corp., San Jose, Calif.; D. P. Bryant, vice president and general manager, Bekins Van & Storage Co., Los Angeles, Calif.; James C. Worthy, personnel department, Sears, Roebuck & Company; and H. J. Stroud, manager, industrial relations department, Signal Oil & Gas Co., Los Angeles, California.

Fundamentals of Lubricating Greases and Their Applications. Published by Shell Oil Co., 50 W. 50th St., New York 20, N. Y. 40 pages. Illus-

WIPE WELD SPATTER CLEAN



Don't fight with weld spatter. Wipe it off in a flash and save up to 85% of weld cleaning labor. Simply brush Protect-O-Metal No. 2 on weld area and adjacent surfaces, weld, and unsightly troublesome weld spatter wipes clean with a dry cloth. Get smooth, clean welds ready for painting if desired. P. O. M. No. 2 does not cause smoke, fumes or odors; contains no organic ingredients. One coat serves for single or multi-pass welds, costs a tenth of a cent per foot of weld, saves up to three times its cost in time savings alone. Order a trial gallon ($3.25).

PROTECT-O-METAL

POM

G. W. SMITH & SONS, INC. GWSMITH 5407 KEMP RD., DAYTON, OHIO

trated. Heavy paper covers.

The eleventh in Shell's "Panorama of Lubrication" series, this booklet covers the lubrication of metal-working presses and describes the make-up and general character of greases, the jobs they are best suited for, and how they are made to do particular jobs. In addition to metal-working presses, the booklet shows how greases function in anti-friction bearings, centralized lubrication systems, steel-mill machinery, Diesel-electric locomotives, textile machines, and paper machines. Practical limitations of greases are also discussed.

Small Plant Management. Prepared under the auspices of American Society of Mechanical Engineers. Published by McGraw-Hill Book Co., 327 W. 41st St., New York 18, N. Y. 499 pages. Price, $6.00.

This book shows how small plants fit into the economic picture, how they are set up and operated, and the overall opportunities for small plants both in this country and abroad. From concepts and principles of scientific management to considerations in financial planning, from the legal side of production planning to sales tools and their uses, from building employee morale to the know-how rules of machine planning, the volume analyzes the many functions that aid in the establishment of efficient and profitable management. The book is divided into three parts and twenty chapters, covering small plants as economic factors, management tasks, and small plant future. The book is written to provide significant management techniques suitable for application in the small plant.







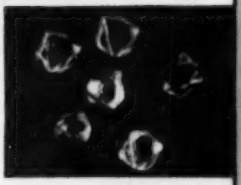
Designing with Aluminum Extrusions. Revised Edition. By H. V. Menking. Published by Reynolds Metal Co., 2500 S. 3rd St., Louisville 1, Ky. 138 pages. 390 illustrations. Wire bound.

This book breaks down the advantages of the extrusion process into eight principles of design, each of which is illustrated and explained in detail by the use of diagrams, charts, and pictures of actual parts. Examples of effective extrusion design, showing details of specific applications, and the manufacturing possibilities of the broad range of shapes which can be produced by the extrusion process are fully discussed. The book correlates shape design with manufacturing limits, showing how many of these limitations can be offset by proper design, and contains complete sections on the principles of structural design, the interlocking of parts, and joint design.

Because the extrusion process often permits the elimination of machining by providing parts of exact dimensions and cross section desired, the dimensional tolerances inherent in the process are fully analyzed and explained. The characteristics of aluminum itself, the selection of the correct alloy and temper, fabricating properties, finishes, and cost factors are also covered as separate chapters. In addition, a tabular section presents 16 tables of data on the chemical, mechanical, and physical properties of aluminum, as well as extrusion process data, such as minimum thicknesses, maximum lengths, tolerances, difficulty factors, and the like.

Procedure Handbook of Arc Welding Design and Practice. 9th Edition. Published by The Lincoln Electric Co.,

CLIPPER
PRECISION DIAMOND TOOLS
Industrial Diamonds
Thread Grinders
Turning Tools
Engraving Tools
Dressing Tools
Diamond Powder


CT5 Cluster Tool
Every CLIPPER tool is guaranteed. Send blueprints. Let us quote on your requirements.

Quick Delivery on Diamond Wheels
Representatives in Principal Cities
CLIPPER DIAMOND TOOL CO., INC.
21-C W. 46 ST. N Y 19



12818 Coit Rd., Cleveland 1, Ohio. Over 1200 pages, 6 x 9 inches. 1300 illustrations and drawings. Semiflexible gold embossed simulated leather covers. Price, $2.00, postage prepaid, in the United States; $2.50 elsewhere.

This edition of the "Procedure Handbook of Arc Welding Design and Practice" has been completely reorganized and re-edited to bring all information up-to-date and include recent important welding developments. New design data have been included to make the book more helpful to designers of welded machines and structures. Latest procedures are presented for welding all metals and alloys commonly welded with manual open arc and hidden arc welding processes as well as automatic and semi-automatic hidden arc welding practices.

A completely new chapter on weldability presents a comprehensive survey of this important subject. The section on structural design has been enlarged and revised to include more information on welded rigid framing. Design techniques developed by leading consulting engineers for recently erected structures are included. The machine design information in the book has also been enlarged to include more information on the welded design of machine tools.

A completely new chapter has been added to the book on welded design data. This chapter presents the fundamentals of welded design for both machinery and structures. It provides fundamentals, such as stress allowables, which can be applied to particular design problems and affords the designer the necessary tools for approaching problems he may have in designing for welding.



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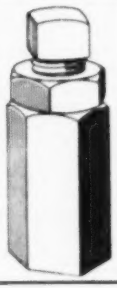
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A useful aid in set-up work for tool and production shops. Many uses. Has hardened set screw and jam nut to lock in position. Write for prices and bulletin of 350 fixture parts.



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Bibliography on Non-Metallic Bearings. Available from The Engineering Societies Library, 29 W. 39th St., New York 18, N. Y. Price, $2.00.

This publication is an annotated bibliography of 100 selected references to the literature of the past 12 years and covering all aspects of non-metallic bearings such as their manufacture, design, properties, wear, lubrication, performance, testing and applications, particularly of bearings made of rubber, wood, laminated phenolic plastics, resin impregnated cotton fabric, micarta and nylon. Applications discussed are for rolling mills, marine propeller shafts and rudder posts, automatic presses, axle bearings for railroad rolling stocks, agricultural machines, and other equipment.

Manual of Equivalent Valves. By H. Gordon Hawes. Published by Hooper Publishing Co., 545 Sansome St., San Francisco, Calif. 175 pages. Price, $15.00.

Of unusual interest to specifiers, buyers and users of valves, this manual includes complete data on equivalent valves, listing the valves of 18 leading manufacturers. This listing shows which valves are equivalent and the design and variations, and is intended as a ready reference for engineers, purchasing agents, and engineering personnel who develop specifications or make purchases of valves.

Basically, the manual serves as a guide to the differences between the valves of these 18 manufacturers for a given type, material, and pressure rating. In case a certain valve is in short supply or unobtainable, the listing shows which other valves are equivalent. The manual is well indexed to enable the user to quickly and easily locate the desired information.





Heat Treatment and Properties of Iron and Steel (Circular 495). By Samuel J. Rosenberg and Thomas G. Digges. Released by National Bureau of Standards and available from Superintendant of Documents, U. S. Government Printing Office, Washington 25, D. C. 33 pages. Price, 25 cents.

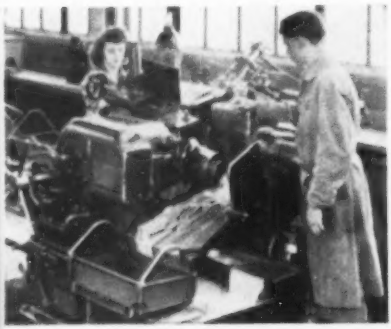
Prepared in simplified form principally to provide an understanding of heat treatment to those unacquainted with the subject, this publication presents basic theoretical and practical principles involved in the heat treatment of various metals. The effects of various treatments on the structural and mechanical properties of iron and steel are thoroughly discussed, although many theoretical aspects and technical details have been omitted for the sake of simplicity.

Subjects presented include properties of iron, alloys of iron and carbon, decomposition of austenite, heat treatment of steels, hardenability, heat treatment of cast iron, nomenclature of steels, recommended heat treatments, and properties and uses of steels. A list of selected references is also provided, and a large number of graphs, tables, and photographs illustrate the text.

Production Planning and Control. By Thomas M. Landy. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 436 pages. Price, $5.50.

Intended to eliminate loss of time and money in solving production planning and control problems, this book outlines a new, scientific approach to the subject. In arriving at much-needed "bench marks" in the field of production planning and control, the author has drawn on his wealth of practical experience with such firms as Thompson Products, Republic Steel, and General Electric where he has been responsible for the successful installation of sound smooth-functioning production control plans.

The first three chapters of the book provide a clear discussion of exactly what production planning and control is and a step-by-step description of its installation and operation. Next, various principles and laws are outlined in detail, together with a breakdown of the various functions involved. Central Production Control, Product Engineering, Production Engineering, Tool Control, Inventory Control, The Individual Order, Dispatching, and Costs are topics which are fully covered. The book also summarizes essential steps in preplanning for a production and control problem and outlines the tie-in between forecasting, buying, manu-



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facturing, and stocking. A guide to frequently used terms, titles, and symbols employed in production planning and control, plus an example of a simple but comprehensive number system, is provided in the appendix.

Fundamentals of Steel Casting Design. Prepared by Charles W. Briggs. Published by Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15, Ohio. 32 pages. 50 illustrations, drawings, charts, and tables. Price, 20 cents.

This booklet is said to comprise a thorough primer of fundamental practices useful to designer and foundryman alike. Emphasis is directed particularly to considerations looking to reduced production costs, elimination of unnecessary weight, improved casting quality and castability.

The major portion of the booklet is devoted to detailed discussion and illustration of accepted rules of economical and dependable steel casting design. Other sections deal with characteristics of the material, explicit reasons why design engineers should concern themselves with steel casting design, and elimination of possible defects through good design. An important part of the book is concerned with improvements through conversion redesign, with summary consideration of advantages obtainable by such conversion in respect to various competitive structures.



Engineering Metallurgy. By Alexander P. Gwiazdowski. Published by C. C. Nelson Publishing Co., Appleton, Wis. 260 pages, 6½ x 9½ inches. 141 illustrations. 39 tables. Cloth binding, board covers. Price, $4.00.

A practical working text and reference for draftsmen, designers, engineers, production executives, and supervisors of heat-treating departments, this book is designed to provide basic metallurgical information about the nature and characteristics of the commercially important metallic elements and their alloys. Data dealing with chemical analysis, applications, and heat treatments of various tool steels were obtained from metallurgical departments of industry.

The contents of the book are divided into 18 chapters covering the following subjects; Metals and Their Properties; The Static Properties of Metallic Materials; Structures and Compositions of Ferrous Alloys; The Metallic Elements, Properties, Alloy Compositions, and Uses; Steels, Ingot and Wrought Irons; Rolling Processes; Applications of S. A. E. Steels; Heat Treatment of Ferrous Alloys; High-Speed and Commercial Tool Steels; Corrosion and Heat-Resisting Steels; Processing of Rolled Steels; Cast Ferrous Alloys; Cast Steels; Light Non-Ferrous Alloys (Auminum); Light Non-Ferrous Alloys (Magnesium); Heavy Non-Ferrous Alloys; Bearing Metals; and Finished Steel Products by States.

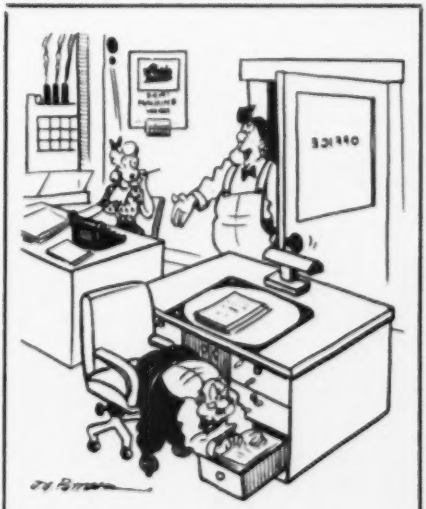
Improving the Efficiency of Plant Management (Production Series No. 190). Published by American Management Association, 330 W. 42nd St., New York 18, N. Y. 32 pages. Paper covers. Price, 75 cents.

A report of company experiences,

THE accompanying illustration shows a model of the exhibit displayed by Lindberg Engineering Co., Chicago, Ill., at the 32nd National Metal Exposition held in Chicago's Amphitheatre the week of October 23-27, 1950. The scaled planning model (one inch to the foot) was built by Lindberg for the purpose of visually grouping its diversified manufacturing divisions which were represented in an unusually large exhibit space. Visitors to the exhibit viewed the following equipment: heat-treating furnaces, melting furnaces, high frequency equipment, electrical equipment, laboratory furnaces, air and hydraulic equipment, samples of fabrication work, and auto accessories.



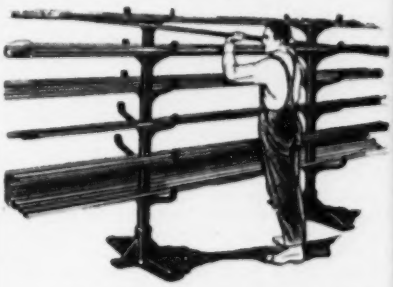
this booklet is comprised of papers dealing with improving the efficiency of plant management. The publication covers the following subjects: Installing A Foreman's Budget and Bonus Plan, Stepping Up Production with the Unit System, Mechanized Inventories for Streamlined Production Control, Aids for Improving Shop Flexibility, and Keeping Management Informed. The authors of the papers are Gene P. Hopkins, general works manager, Nelson Stud Welding, Lorain, Ohio; F. A. Pechter, general manager of manufacturing, Varsity Pajamas, Inc., New York, N. Y.; D. V. O'Leary, director of purchasing and stores, United Air Lines, Chicago, Ill.; Henry A. Tobey, general superintendent, Canton Bearing Division, Timken Roller Bearing Co., Canton, Ohio; and George W. Torrence, labor relations manager, Caterpillar Tractor Co., Peoria, Illinois.



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The BROWN SECTIONAL RACK saves the time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time.



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It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil. SEND FOR BULLETIN No. 26-B DESCRIBING

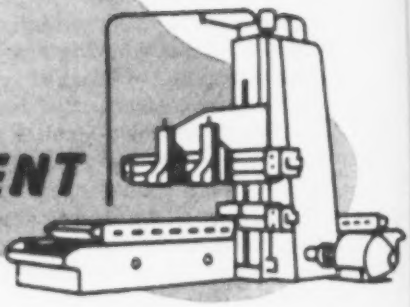
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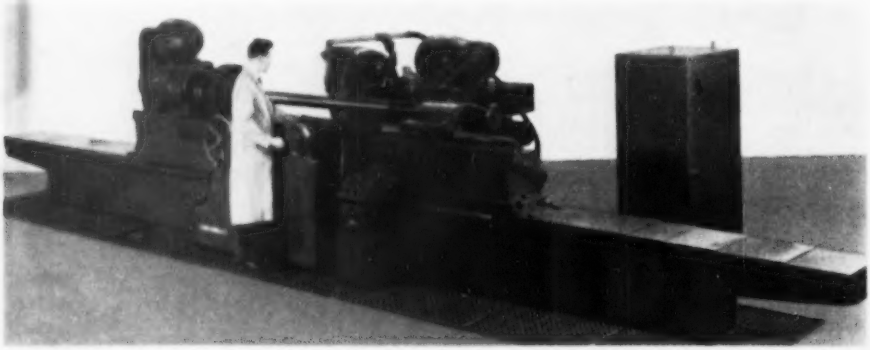
Gap Grinding Machine

A center type grinding machine with a gap table for grinding locomotive piston rods and similar parts requiring additional swing for a large diameter of short length has been announced by Cincinnati Grinders Incorporated, Marburg Ave., Cincinnati 9, Ohio. The machine has a nominal 16-inch swing, 40 inches over the gap, and is available in 96, 120, 144, and 168-inch lengths. The grinding wheel spindle operates on "Filmatic" bearings which automatically adjust themselves to variations in forces created by the grinding action. The table is traversed by means of a rack and pinion plus a simple drive from the motor. Traverse rates are said to be infinitely variable between 3 and 120 inches per minute through a d.c. motor controlled electronically from an a.c. source.

The Cincinnati Filmatic 16-Inch Gap Grinding Machine utilizes a dead-spindle d.c., motor-driven headstock having a Brown & Sharpe No. 15 taper hole in the spindle. Spindle speeds are rheostat controlled and infinitely variable from 20 to 72 r.p.m. A 20-h.p. motor drives the grinding wheel spindle through matched V-belts, a 2-h.p. motor drives the headstock, and a 1½-h.p. motor drives the table. A gravity lubricating system at the front of the headstock incorporating a reservoir with visible level supply and visible rate of flow, protects all moving parts.

Engine and Toolmaker's Lathes

Designated as the Series 60, a line of engine and toolmaker's lathes available in 14, 16, and 20-inch sizes has been announced by the Monarch Machine Tool



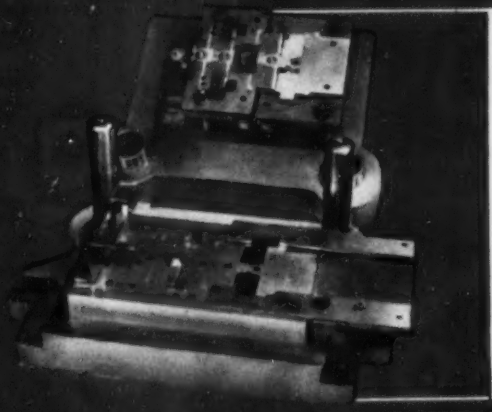
Cincinnati "Filmatic" 16-Inch Gap Grinding Machine

more than 8,000,000 parts



they built the die in a

DANLY PRECISION DIE SET



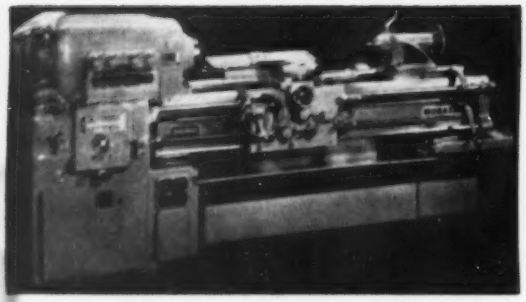
Danly precision makes every Danly Die Set a reliable base for the finest die work. Time is saved in the die shop because Danly Die Sets are square and true . . . they assure longer production runs in the press because precision closure protects die parts. Standard Danly Die Sets are quickly available from a nationwide system of completely stocked assembly branches.* Just phone for fast delivery, and for the finest in die set precision, always specify Danly.

DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Ave., Chicago 50, Illinois



DANLY



Monarch Series 60 14-Inch Toolmaker's Lathe

Co., Sidney, Ohio. Each machine incorporates a totally enclosed gearbox and end gearing. The headstock contains helical gears, thus providing for maximum tooth contact. Automatic pressure lubrication is provided to the gearbox and end gearing, as well as to the headstock, apron, carriage bearing on the ways, and compound bottom slide on the carriage. All bearings are of the antifriction type.

The Series 60 lathes are said to be ideally suited for work based on the Metric measurement system because transposing end gears are available which provide pitches in millimeters and feeds in inches. Regular engine lathe equipment comprises a dog plate, compound rest, centers, thread chasing dial, chasing stop, and wrenches. Standard equipment for toolroom lathes also includes a faceplate, steady rest, and oil pan.

Demagnetizer

A dual compact portable demagnetizer for removing magnetism from small metal tools, cutting tools, gears and work in machine production is now being marketed by Magnetic Specialties Corp., 25 Park Place, New York 7, N. Y., Designed to demagnetize on 110-volt alternating current, the unit can also be used as a magnet on direct current. It is claimed to separate ferrous from non ferrous metals and to lift a 30 to 40-lb. load with flat surface.



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(Two-Jaw or Three-Jaw)

WRENCHLESS CHUCK

will pay for itself in 60 to 90 days on production schedules by giving MORE parts per hour at a LOWER cost per part. Most round parts can be set in the Barker Wrenchless Chuck without stopping the machine. It saves time, helps speed up production, and cuts spoilage where the run is continuous on turrets, engine lathes, cutting off machines, drill presses or any other type of chucking machine. The Barker Chuck shown here, replacing an ordinary 3-jaw chuck, jumped production from 18 to 24 pieces per hour. It can do it in *your* plant too. Let us show you how!



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Chuck Division

THOMAS HOIST CO.

28 S. HOYNE **CHICAGO 12**

Replace for PROFIT with SHELDON Precision Lathes





MOST "run-of-the-hook" tool room work comes within the capacity of Sheldon Precision Lathes—can be done with equal accuracy, at lower tool cost, lower power cost, in less time, *and at greater profit* on a Sheldon than it can on many of the costly, cumbersome, space-wasting older lathes found in most shops.

These extremely accurate (Zero Precision Taper Roller Bearings), large capacity for size (1⅛" hole thru spindle), light, fast, easy to operate, space saving, moderate priced lathes will turn out not only more pieces per dollar, but on many jobs, more pieces per hour, than most older large lathes. When figuring replacement of obsolete equipment, remember you can have two or more of these efficient little money makers for the tool investment you made for the large lathe you are replacing.

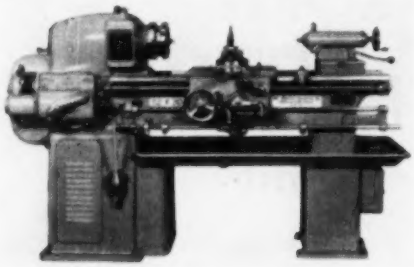
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CHICAGO

SHELDON MACHINE CO., INC. • 4250 N. Knox Ave., Chicago 41, Ill.

General Purpose Lathe

Designated as the Model No. 1, a general purpose lathe available in sizes of 12 x 30, 12 x 42, and 12 x 54 inches with maximum swing over the ways of 14½ inches has been announced by The Hendey Machine Co., Torrington, Conn. The lathe incorporates induction-hardened and precision ground bed ways. The spindle is mounted in precision preloaded ball bearings and is driven by five V-belts Speeds are selected with a single level belt shifter from four-step cones mounted on a 3 h.p. reversing motor and on the jackshaft. A spindle speed range of from 30 to 1,142 r.p.m. covers the necessary



Hendey Model No. 1 General Purpose Lathe

speeds for carbide tools and fine work finish, and there are 36 selections for threading from 1½ to 80 and 36 selections for feeds from 0.0031 to 0.1666 inch.

Standard equipment of the Model No. 1 includes motor in fully enclosed cabinet leg; standard LI taper spindle nose; totally enclosed headstock; lead screw reverse; automatic apron stops for both directions; full electrical equipment; and latch lever apron controls.

Multi-Purpose Stacking Box

A standard-size multi-purpose stacking box which measures 10 x 18 x 6 inches has been developed by the Bay Metal Products Co., 3015 N. 16th St., Philadelphia 32, Pa. Available in 16 and 18 gauge metal, the stacking box features a drop handle at each end, reinforced corners, and continuous stacking rim on all four sides. Four rivets and spot-welded construction provide for maximum strength and rigidity.

Accurate Hole Transfer Made Easy With

NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 1/16" to 3/4" U.S.S. Inexpensive — Last for years.



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ASSORTED NEEDLE FILE SETS
5½" and 6¼" overall
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new needle file case

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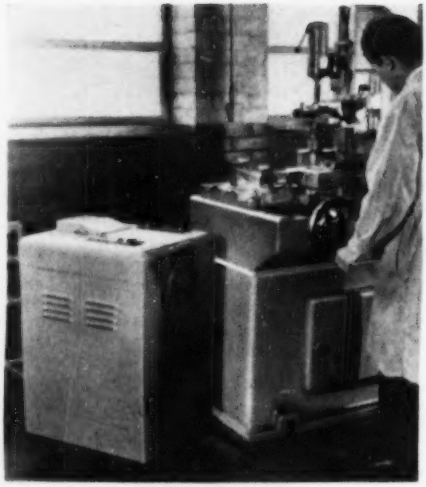
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NEW YORK • CHICAGO • MONTREAL

Automatic Checking Recorder

Designated as the Model MTR-1, an improved automatic recorder for obtaining permanent chart records of involute tooth forms, tooth spacing, leads, contours, thread forms, and so on, has been announced by Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Mich. Designed primarily as an accessory to Michigan Sine-Line gear checking equipment, the recorder has many other useful applications. Up to 0.002 inch of error, both plus and minus, can be recorded automatically across the chart of the instrument.



Michigan Tool Model MTR-1 Automatic Checking Recorder in use

Outstanding features of the recorder include a selective two-speed chart drive and a standardized interchangeable precision electronic gage head. Other features comprise a convenient compartment in the base of the recorder for storing spare rolls, inks, ink pad, and so on; a specially designed hand stamp for indicating filing data which should be filled in on each completed chart; and glossy-white interior finish to ensure adequate lighting of all interior parts in the event that servicing of the recorder is required. A graduated handwheel is provided for manual operation when automatic operation is not desired.

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DIVIDING HEADS



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3 SIZES — 4 MODELS — 6" to 12"
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Model PE-1

2 & 3 dimensional models

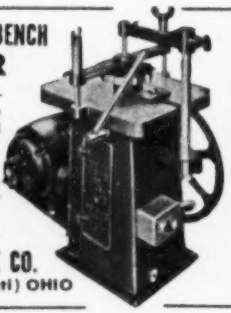
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For Contour Milling, Profiling, Intricate Cams, Calibrating, Die and Mold making. Engraves on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics • Drills a series of holes • Increases accuracy and production • Etches glass and similar items • For information and prices write Dept. M.

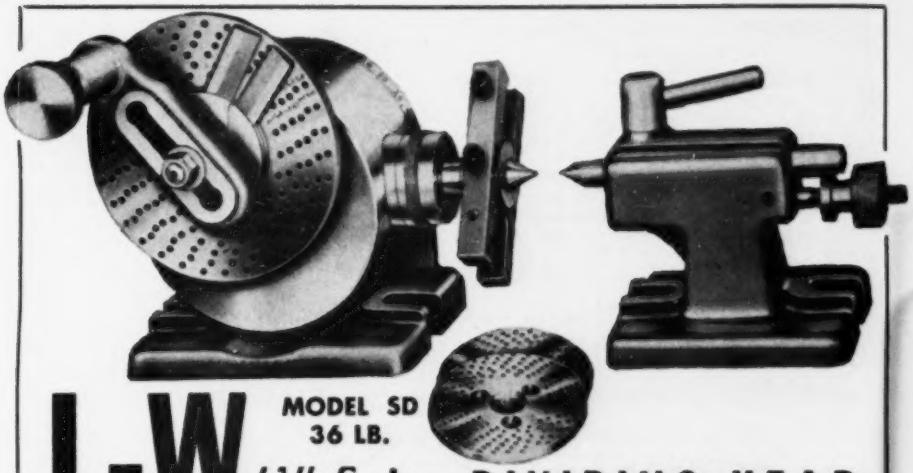
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Portable — move directly to job; a time saver for both small and large shops.
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Low first cost — prompt delivery.
Good dealers wanted.



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L-W MODEL SD 36 LB. 6½" Swing DIVIDING HEAD

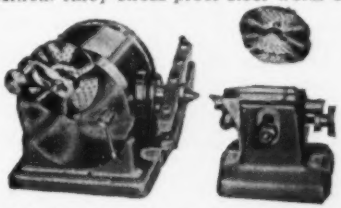
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SPINDLE THREADED 1½"-8 TO FIT L-W 5" UNIVERSAL CHUCK

Heavy duty headstock and tailstock designed for maximum rigidity. Alloy steel threaded headstock spindle with extra large tapered bearing and takeup adjustment collar. Head tilts to 90° in vertical position. Alloy stress-proof steel worm and accurately cut worm wheel cut to close limits for accuracy. Ball bearing thrust and adjustable for end play. Complete with three index plates for dividing all numbers to 50 and even numbers to 100, except 96T. Index chart shows all divisions obtainable to 380. Right or left hand models.



Model BP 11" Swing for plain milling machines. Shipping weight, 140 lbs.... **$189.20**



Model AU 11" Swing. Fully Universal for complete indexing and spiral cutting. Shipping weight, 190 lbs. **$273.86**

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L-W CHUCK COMPANY 28 SO. ST. CLAIR ST. TOLEDO 4, OHIO

Automatic Air-Powered Drill Press Feed

The Beckett-Harcum Co., 1142 Wayne Rd., Wilmington, Ohio, has announced the production of an automatic air-powered drill press feed which is available in either standard or heavy-duty models in four speed types: (1) drill; (2) drill with dwell; (3) drill, chip clean and dwell; and (4) drill and tap. The feed is designed to fit all drill presses having 1¼-inch pinion shafts.

With the standard model, the maximum length of stroke is 2½ inches on 1¼-inch pinion shaft or 270 degrees of the shaft rotation. This model is designed to develop a drill point thrust of from 4 to 750 lb. The heavy-duty model has a maximum length of stroke of 4 inches on 1¼-inch pinion shaft or 445 degrees of shaft rotation and is said to develop a drill point thrust of from 10 to 1,250 pounds.

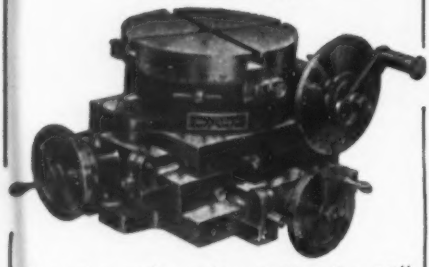
Other operating features of the feed include instant reversal of thrust on breakthrough; accuracy of 0.001 inch maintained on depth control; and infinitely variable adjustment of stroke speed in either direction.



Illustration showing Beckett-Harcum Air-Powered Drilling-Tapping Feed mounted on small drill press

No. 1 COMPOUND TABLE

With 7½" Dial Type Rotary Table Mounted



We also make a No. 2 Size for 12" Rotary Table. Can be had without Rotary Table.

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Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Machines • Screw Head Slotters.

John B. Stevens Inc.

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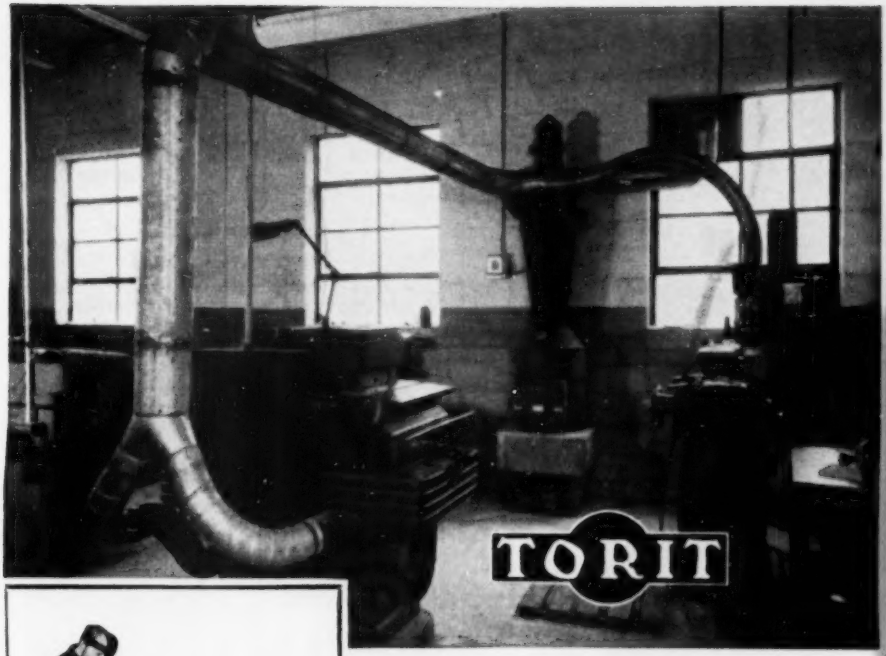
It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained complete tool. No wrenches or pliers are necessary. Made in ⅜" to 1" diameters. *Send for price list.*

HEIMANN MFG. CO.

330 Lincoln Ave. Urbana, Ohio





TORIT
Dust Collectors

Self-contained units for carrying away dust laden air from around grinding, cut-off and polishing machines. They are available in many styles and in sizes ranging up to 5 H.P.

Giving the old "One-Two" to the abrasive dust problem with a

TORIT DUST SEPARATOR

A one-nozzle set up as at the right, or the two-nozzle arrangement on the carbide tool grinder in the foreground—one machine or the other in operation—this Torit Dust Separator handles the dust problem efficiently, and requires little care and attention.

Compact, well arranged installations like this do not interfere with production. They mean better working conditions, higher output, and fewer rejects. That is why over 18,000 Torit units are working today in every type of American industry.

If you cut, grind or polish in your plant, you have a dust problem, and it will pay you to write Torit about it. We'll show you how it can be licked, and there'll be no obligation.

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Erickson Three-Position Indexer

Indexer Three-Position

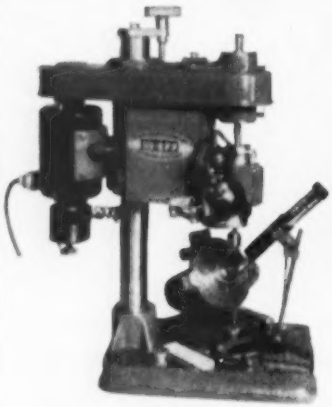
A positive locking indexer which is said to speed up and simplify locating and positioning operations requiring three divisions (120 deg.) has been placed on the market by Erickson Tools Division, 2304-A Hamilton Ave., Cleveland 14, Ohio. Claimed to be easily adapted to any job requiring three-position locating, including milling, drilling tapping, punching, and similar machining operations, the indexer, when connected to table controls, follows a complete cycle of operations without attention from the operator. Accurate spacing is said to be assured by the positive locking mechanism of the unit.

Magnetic Clutch

Designed for service and other devices where rapid engagement and release are required, a compact magnetic clutch which has a capacity of 0.20 h.p. with an input of 3 watts has been announced by the Barber - Colman Co., 9514 Loomis St., Rockford, Ill. When the electromagnet is energized, the cork-faced driven disc is faced on both sides for high torque transmission, and a splined bore in the disc permits easy coupling to the load. The driving plates are ventilated for rapid cooling. The maximum torque of the clutch is 4 pound-inches, and the maximum speed is 3,600 revolutions per minute.



Barber-Colman Magnetic Clutch



Taylor

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3. Spindle supported by 4 select, precision bearings—other moving parts precisely ground and lapped.
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C/R's new Jaw-Head rawhide hammer has everything. It protects fine finishes and delicate machine parts. Delivers powerful controlled blows over long periods. Tightly coiled rawhide faces are changed with amazing speed and convenience. Simply loosen nut, replace faces, tighten, and hammer is ready for use. C/R Jaw-Head hammer faces are made of tough, resilient water buffalo hide, the most durable of "soft" striking surfaces. Safety-Flare grip handles are easy to hold — prevent slipping. For maximum power, durability and protection use C/R's new Jaw-Head *rawhide* hammer!

● *Other C/R striking tools: Rawhide Mallets, Rawhide Mauls, Solid Head Rawhide Hammers.*

● ***Out with the old face — in with the new!***

To release jaws, loosen this nut.

Change to new C/R Rawhide faces.

To tighten nut, use wrench for best results.

Available from leading industrial suppliers.

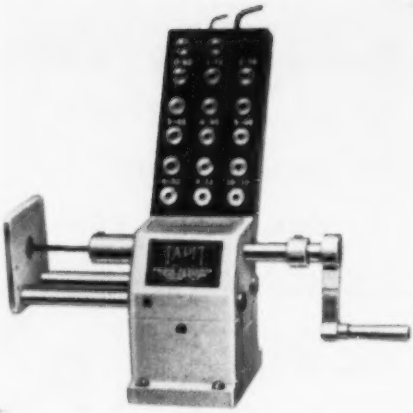
CHICAGO *Rawhide* MFG. CO.

1207 Elston Ave. Chicago 22, Illinois

Chicago Rawhide mallets and hammers are stocked and distributed in Canada by Super Oil Seal Manufacturing Co., Ltd., Hamilton, Ontario

Hand Tapping Unit

Known as the "Tapit," a hand tapping machine screw threads has been announced by the Photo Research Corp., Burbank, Calif. Designed to minimize tap breakage, the unit features an adjustable collar which can be quickly and easily set for any given depth of tapped hole; a crank handle which rotates on a spindle for ease of operation; twin guide bars to hold work in alignment with the tap; and an angle bracket which is adjustable to accommodate various sizes and shapes of work. The unit can be operated with or without the angle bracket depending on the nature of the work. An easily removable collet and wrench panel is also available for the unit, which, in addition, may be obtained complete with a set of high speed taps.



"Tapit" Hand Tapping Unit

Oil Spray

A rust preventive oil and lubricant known as "Gun Guard" and packaged in an Aerasol container for spray application to metal parts and frabrications in storage and production, firearms, tools, implements, and so on, has been introduced by The Mitchell-Bradford Chemical Co., 2446 Main St., Stratford, Bridgeport, Conn. Parts or assemblies either in storage bins or production lines can be easily and conveniently sprayed with the oil which is a polarized type and is said to displace any wetness or dampness on the metal surfaces, resulting in long corrosion resistance.

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Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys and features a chart for checking machine racks.

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Only with Localites can this high efficiency of illumination be obtained for the vital seeing zone of each worker's task. Thousands of industrial plants have found Localites the economical, sure way to get more and better production — at lower cost.

LOCALITES are available in a selection of 30 models with various type reflectors, arms and bases for every industrial need.



MODEL 3267-H-174

Reflector orifice 5"x3-7/8". Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Overall length, 32-3/4". Wrinkled grey enamel finish. Flat oblong base. Wire with 8 ft. oil-resistant cord.

$6.12 EACH in pkg. of 6
Single Units $7.65 ea.

MODEL 3470-P-172

Reflector orifice 6-9/16" dia. Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Overall length, 48-1/4". Wrinkled grey enamel finish. Circular base. Wired with 8 ft. oil-resistant cord.

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GENERALITES for Overall Lighting • LOCALITES for Light ON the Job

THE FOSTORIA PRESSED STEEL CORP.
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LOCALITES ARE AVAILABLE THROUGH SELECTED DISTRIBUTORS EVERYWHERE

Taper Measuring Fixture

Designated as the "Taper-Chek," a taper measuring fixture which is said to simplify the job of inspecting tapers has been introduced by the Webber Gage Co., 12899 Triskett Rd., Cleveland 11, Ohio. The fixture, which is designed for use only with Webber angle blocks, consists of a base and three V-blocks capable of holding and measuring any standard taper up to a No. 50 milling machine taper, plus any special taper in that size range.

For accurate readings, the operator merely assembles the proper combination of angle blocks. The blocks are then mounted with the work on the fixture and an indicator reading is taken. According to the manufacturer, the measuring operation requires less than two minutes, and a taper is checked within a tolerance of 0.00002 inch in 4 inches.



Webber "Taper-Chek" Taper Measuring Fixture



GRAY TURRET HEAD METAL CUTTER OR NIBBLER

N.A.M. Pioneer Award Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

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A VERSATILE, PRECISION, SMALL MILLING MACHINE AT A VERY LOW PRICE.

Power or hand feed. Use on pedestal or bench. Send for complete information on various Burke millers and attachments.

The BURKE MACHINE TOOL Co.

A Division of U. S. Burke Machine Tool Co.
22 East 72nd St. Cincinnati 16, Ohio

Toolmakers' Lathe Components

The Hauser Machine Tool Corp., 30 Park Ave., Manhasset, N. Y., now has available precision components of Schaublin toolmakers' lathes. The components allow for the assembly of a high precision lathe to fit specific requirements. A wide variety of interchangeable headstocks, beds, carriages, tailstocks, special attachments, and controls can be obtained. Precision and complete interchangeability of components is said to be assured.



SOMERSET Radius Dresser SAVES TIME

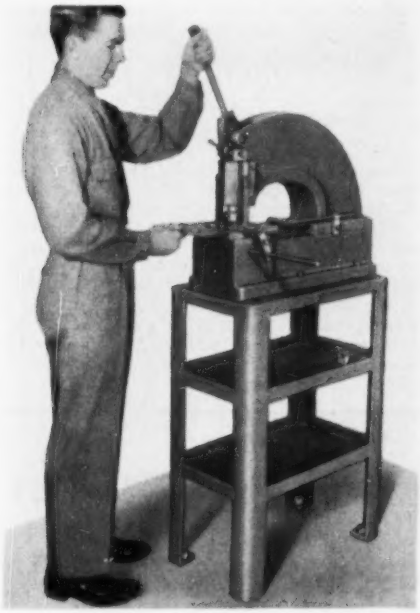
Thousands of Somerset Dressers in service. Offer outstanding features — Wheel is dressed from below, avoids removal of guard. Stop pins permit rotation thru 180° or 90° either direction. Wearever bearing is dustproof.

Write for illustrated folder. *Immediate Delivery*

SOMERSET TOOL CO. 320 Virginia St. Hillside, N. J.

Precision Punching Machine

Known as the "Di-Acro" No. 2, a precision punching machine with a 12¼-inch throat depth and a 3⅛-inch throat height which is said to be capable of punching holes of various shapes and sizes as large as 4 inches in diameter has been announced by the O'Neil-Irwin Mfg. Co., 306 Eighth Ave., Lake City, Minn. The machine can also be employed as a precision punch press for an unlimited variety of blanking, drawing, embossing, and forming operations. The powerful action of the punch is obtained through a roller bearing cam which converts a small amount of operator effort into a high pressure at the point of impact. The machine utilizes a triangular-shaped ram which is hardened and precision ground for maximum accuracy.



"Di-Acro" No. 2 Punch in use

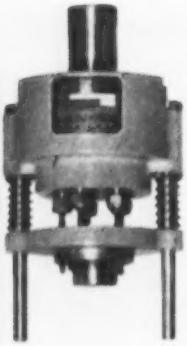
Primarily designed for short-run operations, the punch can also be used for production work on lightweight materials. A wide variety of readily interchangeable punches in round, square, oval and rectangular shapes is available for the machine, thus making it applicable for both experimental work and production operations.





Multiple Spindle Drill Head for Automatic Turret Lathes

The U. S. Drill Head Co., Dept. J, 616-618 Burns St., Cincinnati 4, Ohio, is now manufacturing a multiple spindle arm head of the fixed center distance type which is particularly designed for application to automatic turret lathes. Mounted on one or several turret faces, the drill head accomplishes the drive to the various drill spindles by using a center arbor which is surrounded by properly meshing gears. According to the manufacturer, precaution has been taken to provide safety factors against the possibility of jamming the driver and the driven lugs as the turret slide moves the head into operating position.



U. S. Multiple Spindle Drill Head for automatic turret lathes

Floating Holder

The "JA" Floating Holder now being manufactured by Scully-Jones & Co., 1909 S. Rockwell St., Chicago 8, Ill., utilizes a double gear or spline drive coupling to provide unrestricted parallel and/or angular float for accurate tapping, reaming, and similar operations. The holder is said to instantly correct misalignment between tool and work. Equal freedom of float in all directions, even under heavy loads, is claimed to be provided.



Scully-Jones "JA" Floating Holder

The holder is said to be ideal for close center and multiple spindle work because of its small diameter. Wear of the floating elements is reduced to a minimum due to the positive lubrication of all parts during operation, and large areas of lubricated surfaces cushion torsional shock and overload. The holder is available in three sizes.



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Chicago Mounted Wheels

will save you Time and Money

Chicago Mounted Wheels really cut—don't just rub. They provide a custom-built product to fulfill virtually every kind of grinding and polishing operation. They speed up production—last longer—and cost less . . . with a variety of styles and sizes to cover every type of operation.

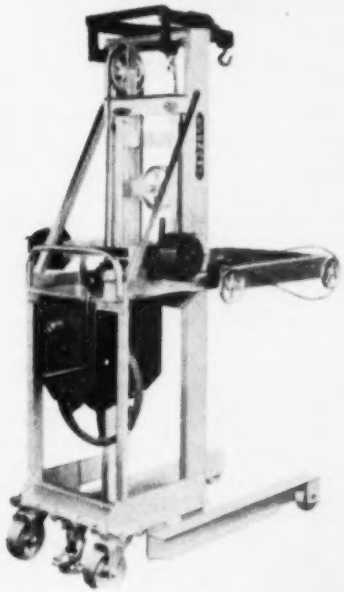
Offices and stocks in principal industrial centers.

Write for Free Catalog, plus details on Free Engineering Service.

CHICAGO WHEEL & MFG. CO.
1101 W. Monroe Street, Dept. MMS
Chicago 7, Illinois

Die Handling Accessories

To further aid in the handling of large dies, the Economy Engineering Co., 4507 W. Lake St., Chicago 24, Ill., has developed two accessories for use with its Type DX Heavy Duty "Shoplifter." One accessory is a die pulling winch for sliding heavy dies on or off the platform plate. The winch consists of a self-locking mechanism geared to two cable drums and mounted above the hoisting unit of the machine. Each drum contains a pulling cable that leads out on one side

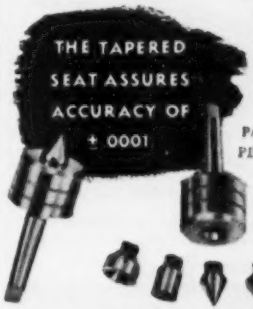


Economy "Shoplifter" with accessories

of the platform plate through pulleys to pull the die on and off the platform as required. The drums and cables are mounted on opposite sides of the platform. The self-locking feature of the winch is said to permit one operator to place a die into an inclined press bed, leaving the winch to adjust the die through the winch crank handle at any time without the necessity of having another operator hold the load.

The other accessory is an "A" boom with a swivel hook at the outer end that can be placed on top of the frame. The hook supports a chain sling so that dies can be easily separated by hooking the upper part and then lowering the platform plate.

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LIVE CENTERS
• ACCURATE • VERSATILE
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• HEAVY DUTY



Manufactured in all tapers. 1 to 6 MT in stock. Special shanks and points made to order.

PAT. PEND. Points illustrated are standard.



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ERRINGTON
Scores
Again!



FULLY
ADJUSTABLE
DRILLING
HEAD

SIZES: 0 to ¼"
3 16" to ½"
NO. 2 M.T. Socket Capacity

Here's a light, compact tool with a wide range of adjustment. Can drill on squares, rectangles, circles, triangles and irregular patterns. Head is fully geared. Grooved ball thrust bearings on all spindles. Needle bearings wherever possible. Simple locking arrangements. All moving parts hardened. Heads made with 3, 4 and 6 spindles.

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Established 1891
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YOU PROFIT on every job you send to Rutland!



Rutland reworked or repaired cutting tools are guaranteed to give new tool performance — at a fraction of the new tool cost.

Recutting • repairing • replacing Carbide tips. Special tools from obsolete or standard tools, etc.

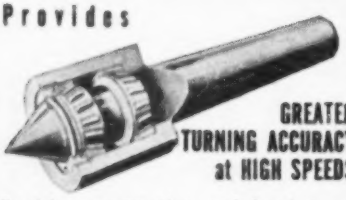
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GREATER TURNING ACCURACY at HIGH SPEEDS

Precision construction and bearing arrangement of Falls Roto Center allows tailstock center to rotate with the work and retain "dead center" accuracy and rigidity.

Two precision quality heavy-duty Roller Bearings, perfectly matched, give smooth, anti-friction rotation at highest speeds. Result is extreme accuracy at maximum production rate.

Write for complete facts in Bulletin MM today.

FALLS PRODUCTS, Inc.

124 Genoa St. Genoa, Ill.

Emery Cords and Tapes

Emery cords and tapes for use in polishing and burring small holes, slots, dies, and so on, are now being manufac-

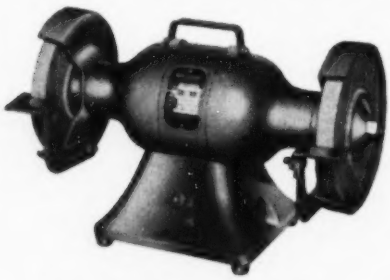


Mitchell's Emery Cord

tured by the E. C. Mitchell Co., Middleton 8, Mass. Cords are available (on spools) in diameters of 0.012, 0.015, 0.018, 0.030, 0.040, 0.055, 0.070, and 0.082 inch and in grains of 120, 150, 180, and 200. Tapes are available (on spools) in sizes of $\frac{1}{16}$, 4/32, $\frac{3}{16}$, and $\frac{1}{4}$ inch and in grains of 150 and 180.

Bench Grinder

Designated as the 600 Series, a 6-inch bench type grinder available in ¼ and ½ h.p. sizes has been developed by the Baldor Electric Co., 4380 Duncan Ave., St. Louis 10, Mo. The grinder has extra wide clearance between the wheels and motor frame to permit the grinding of large and odd shaped pieces. In addition, long pieces may be moved across the front of the motor frame since it is



Baldor 600 Series Bench Grinder

smaller in diameter than the grinding wheel.

Additional features of the unit include a capacitor start, capacitor run motor; full sized ball bearings; and tool rests which may be tilted for angle grinding.

Toolholder

A toolholder for the use of carbide-tipped tool bits has been developed by The Apex Tool & Cutter Co., Inc., Shelton, Conn. The toolholder features interchangeability for different shapes of tool bits and various grades of carbides and is available in straight and offset types.



Apex Toolholders and Tool Bits

The holder includes mating serrations which permit the tool bit to be adjusted for wear and a simple locking device that allows the tool bit to be changed without disturbing the setup of the holder in the machine. Various standard shapes of tool bits can be readily supplied.

Time Delay Valve

Ross Operating Valve Co., 120 E. Golden Gate Ave., Detroit 3, Mich., has announced production of a time delay valve which operates by volume measurement of air. The use of regulated air is said to assure constant repetition of time sequence.



Ross Time Delay Valve

The valve is available for use on all Ross in-line operating bodies which range from ¼ to 1¼ inches in size and are furnished in straight-way, 3-way, normally open and normally closed models. The valve is especially adaptable for jigs, fixtures, machine tools, and other applications.

• 45,512 PIECES PER GRIND





***with* WILLEY'S**
SOLID CARBIDE BORING BAR

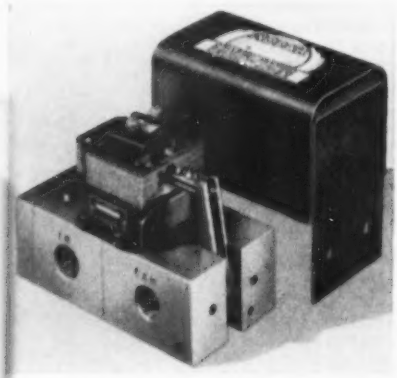
On the typical alloy cast iron valve guide bushing at the right, a Willey's Solid Carbide Boring Bar produced 45,512 pieces per grind during 50 8-hour shifts. After this period the tip was still usable by rebrazing and regrinding.

WRITE FOR CATALOG

WILLEY'S CARBIDE TOOL CO.
SOLE MAKERS OF WILLEY'S METAL
1342 W. Vernor Highway Detroit 1, Michigan

Solenoid-Operated Valve

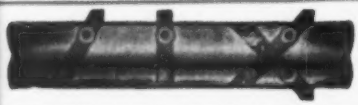
Designated as the Nopak Model SL, a compact, lightweight valve operated by a small solenoid unit has been announced by the Galland-Henning Mfg. Co., 2758 S. 31st St., Milwaukee 15, Wis. Before the solenoid is energized, line pressure is always on the same cylinder port, with the other cylinder port open to exhaust. When the solenoid is energized, the cycle is reversed.



Nopak Model SL Solenoid-Operated Valve

The 3-piece valve body is machined from drawn aluminum and may be easily dismantled. The valve is energized by a continuous duty standard solenoid unit which is said to be unaffected by oil and is easily replaced if necessary. The sealing mechanism consists of a valve ring and O-rings of durable Neoprene. Because the chrome-plated control shaft "floats" in O-rings, it requires a minimum of lubrication.

The Nopak Model SL Solenoid-Operated Valve is claimed to consume very little current and can be operated at air pressures from 40 to 250 p.s.i. Because it functions effectively mounted in any position, the valve may be used for a wide variety of applications. It is designed for either long run, high speed operation or continuous energization in one position. The valve weighs 5¾ lb., is 5⅞ inches long x 3 inches wide x 5½ inches high, and is made in a ½-inch pipe size only which may be readily bushed down to a ⅜ or ¼-inch pipe size. A sub-plate mounting can be furnished on special order if desired.



A BETTER BORING BAR

OUR fine list of Customers is PROOF that our method of broaching square holes makes a better fit for the tool bit. This means more rigidity and longer life especially with tungsten Carbide. We also make bars for our Type B and Type C cutters or a combination of tool bits and cutters. Bars are made to suit customers' requirements as to method of drive, pilot, number of holes, angle of bit, etc. Our two-bladed cutters can be floated in the bar or held rigidly. Cutters are interchangeable—hence can be ground in an arbor in the tool room and only require a few seconds for inserting in the bar.

Square hole sizes range from ⅛" up to and including ¼".

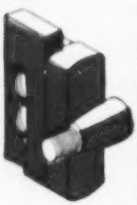
THE DETROIT BORING BAR CO.

688 E. FORT ST. Detroit 26, Mich.

Established 1927

TYPE "B" AND "C" CUTTERS

Suitable for Tipping With Tungsten Carbide



"B" *A strong rigid serrated 2-bladed cutter—located in the bar with a taper pin. Bores holes accurately to close limits. Can be expanded and reground giving long life. Sizes ⅞" dia. up to 6".*



"C" *A simple 2-bladed reaming cutter. Can be expanded and reground. Located in the bar by a hardened V. This V never has to be reground as blades are expanded.*

Fits other bars with slots
⅝" x ⅜"
½" x 1"
⅞" x 1¼"
⅛" x 1½".

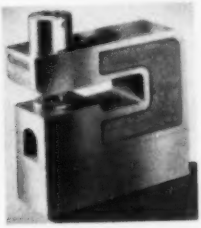




Hole Punching Unit

Designated as the Type "G," a hole punching unit has been announced by the Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y., for the piercing of holes in mild steel up to ½-inch thick. Independent and self-contained, the heavy duty unit is equipped with a "split punch" which is said to collapse sufficiently to release itself from the wall after punching the hole. In addition to the split punch assembly, the unit incorporates a die, guide, and lifter spring.

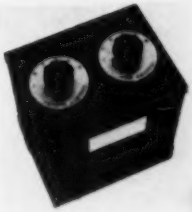
A group of units can be set up on templates or T-slotted plates in stamping rails, strip templates, or T-slotted plates in press brakes, thus permitting the punching of an unlimited number of patterns.



Wales Type "G" Hole Punching Unit

Tap Changing Transformer

Designated as the Type 152-60, a tap changing transformer with 36 steps of output voltage control designed for the accurate control of electric furnace temperatures has been announced by the Hevi Duty Electric Co., Milwaukee, Wis. Containing rugged tap switches and operating from a 60-cycle current, the units is provided with adequate ventilation for heavy duty service. All coils are treated with a high moisture and corrosion-resistant varnish by a vacuum impregnation process.



Hevi Duty Type 152-60 Tap Changing Transformer

LESS DOWN TIME, MORE PRODUCTION FROM PUNCH PRESSES FED BY a



LITTELL DOUBLE AUTOMATIC CENTERING REELS

Vital minutes are saved, with practically no down time for coil replacement, when a Littell Double Reel uncoils stock to the punch press. The idle side of the reel is loaded while the other side pays out. When a coil is used up, the operator simply lifts the hub lock pin, then swivels the reel 180°, thus placing the reserve coil in press feeding position. The change-over is complete in a few seconds. Like Littell Single Reels, Littell Double Reels combine balance that means smooth running accuracy with rugged malleable iron and steel construction that assures year in, year out dependability.

FOUR SIZES

No. 3 . . . . . for coils up to 300 lbs.
No. 5* . . . . . for coils up to 600 lbs.
No. 10* . . . . . for coils up to 1,000 lbs.
No. 25* . . . . . for coils up to 2,500 lbs.
*Can be furnished with motor drive

Write for catalog

F. J. LITTELL MACHINE CO.

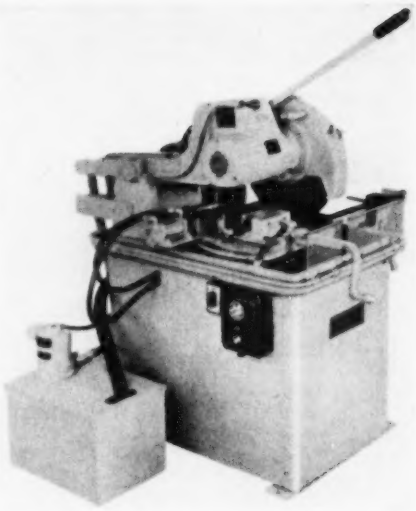
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Metal Cutoff Machine

The Stone "Swing-Cut" Metal Cutoff Machine shown herewith, product of the Stone Machinery Co., Inc., 326 Fayette St., Manlius, N. Y., is fully equipped for wet cutting and includes a recirculating pump, tank, hose connections, and removable splash guards. The flow of the cutting fluid is controlled by the action of the cutting head. For adjusting depth of cut, the machine features a wheel depth control system which is arm operated from the operator's normal position.

Additional features of the unit include an adjustable work stop which can be used for cutting multiple pieces up to 24 inches in length, and splash guards which can be moved for the proper protection when cutting at angles. The machine can also be equipped with an air-activated self-centering vise arranged for either hand or foot control.



Stone "Swing-Cut" Metal Cutoff Machine

Hydraulic Attachment for Iron Bender

A hydraulic attachment consisting of a motor, pump, cylinder, and foot control system for use on its No. 2 universal pipe, bar, and angle iron bender is now being manufactured by the Hossfeld Mfg. Co., Dept. M, Winona, Wis., to provide a smooth, steady bending force for accurate and uniform bending operations.

Monarch Precision

SHAPLANE

Radius Tools

Patent Pending



Five Models for

LATHES, SHAPERS, PLANERS, AND BORING MILLS.

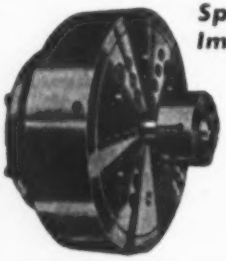
RANGE 1/2" TO 3" RADIUS (MODELS ALSO AVAILABLE FOR CONVEX CUTTING, AND CONCAVE RADII TO 6" ON PLANERS, ETC.)

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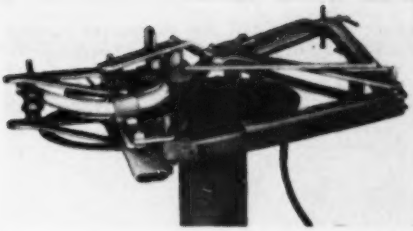
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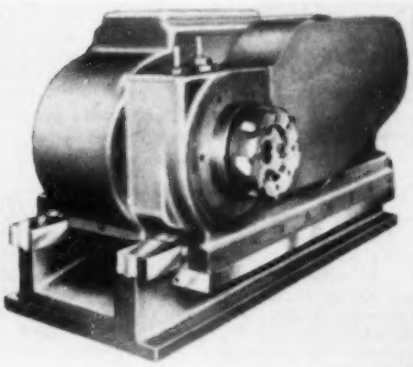
Hydraulic attachment for Hossfeld No. 2 Universal Pipe, Bar, and Angle Iron Bender

Hydraulic power is generated for the cylinder by the electric pump which is connected to the cylinder by a flexible hose. Actuation is effected with a foot control system, and, as soon as the bend is completed, the cylinder returns the swinging frame to its original set position. Heavy stock, such as 2 x 2 x $\frac{5}{16}$-inch angle iron and 2-inch pipe, can be bent easily and accurately.

Milling Head

A milling head wherein all gears are integral or mounted in place solidly by taper and key on the shafts is now being manufactured by The Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, Ohio. Adjustment of the steel quill up to 2 inches to allow for cutter wear is obtained by an Acme thread, and the movement is gaged by a micrometer dial. A flywheel effect is provided by a large, heavy spindle gear mounted solidly on the spindle. Lubrication inside the head to all bearings and

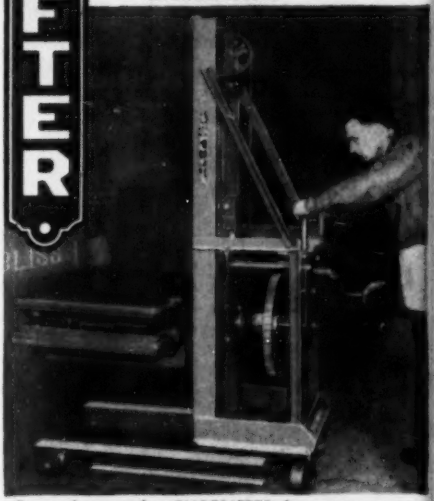
Motch & Merryweather Milling Head



SHOPLIFTER



. . . let an Economy SHOPLIFTER do the heavy work around here.



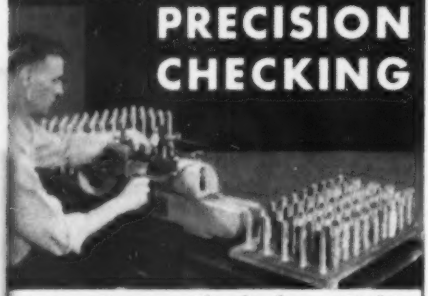
Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOPLIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

500 pound capacity
Type D, hand operated.....$254.00
1000 pound capacity
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Floor lock to hold machine steady:
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Sundstrand Machine Tool Co.

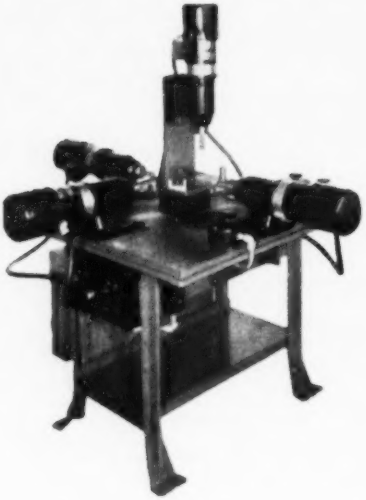
2539 Eleventh St., Rockford, Ill., U.S.A.

gears is provided by a geared pump. Automatic lubrication is provided for the hardened steel ways.

The milling head is arranged with a single speed for production work using either high speed or tungsten carbide-tipped cutters; however, change gears can be provided.

Tapping Machine

The Govro-Nelson Co., 1933 Antoinette, Detroit 8, Mich., has announced a tapping machine which incorporates four

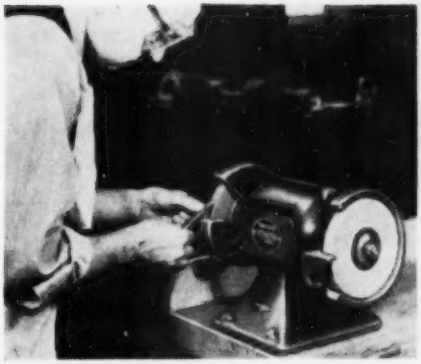


Govro-Nelson Tapping Machine

standard Model "KT" Govro-Nelson tapping units that can be positioned according to the parts being tapped. Suitable for use in tapping a wide variety of parts, the machine can be arranged to perform tapping operations on four different parts, tapping two to four holes simultaneously in each part.

Bench Grinder

Designed to permit easy handling of large and bulky pieces, a bench grinder with extra-large work clearance is now being offered under the trade name of "Skil" by Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill. Designed to allow for easy accessibility to the grinding wheels, the grinder is equipped with extra-large



"Skil" Bench Grinder in use

permanently lubricated ball bearings and heavy-duty cast wheel guards which provide for full protection in performing grinding and wire brushing operations. The guards can be easily removed for the installation of buffing and polishing wheels. The tool rest, which can also be removed, is quickly adjustable for grinding wheel wear.

The grinder is flat-faced to provide full clearance for difficult jobs and is available with a ¼ or ⅓ h.p. split-phase motor for quick starting and smooth operation. It can also be obtained with a ½ and 1 h.p. capacitor-start motor of the low-starting current type for extra heavy service. All motors are totally enclosed for protection from metal or abrasive particles.

The Skil Bench Grinder is offered with 6-inch wheels in the ¼ and ⅓ h.p. sizes, 7-inch wheels in the ½ h.p. size, and 10-inch wheels in the 1 h.p. size.

Selenium Metallic Rectifier

A selenium metallic rectifier of heavy-duty quality available in unusually large plate sizes for use in supplying d. c. power to arc welders, magnetic chucks, magnetic separators, relays, solenoids, and so on, is now being manufactured by the Syntron Co., 309 Lexington Ave., Homer City, Pa. The rectifier is produced by a unique vacuum process whereby vaporization is said to deposit the selenium uniformly over the entire plate area with a complete absence of impurities or other flaw spots.

A selenium rectifier stack is constructed of individual plates assembled

A PRODUCTION MACHINE TOOL

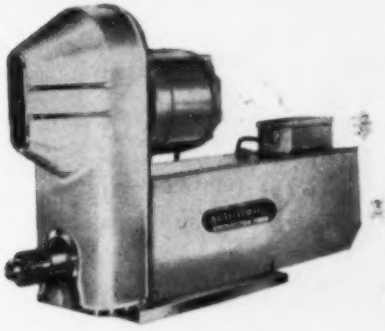
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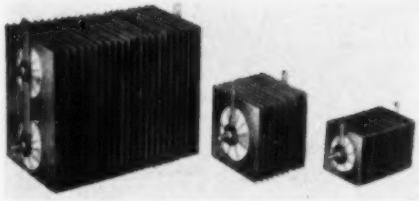
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Socket Set Screws



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5212 Lawrence Ave., Chicago 30, Ill.



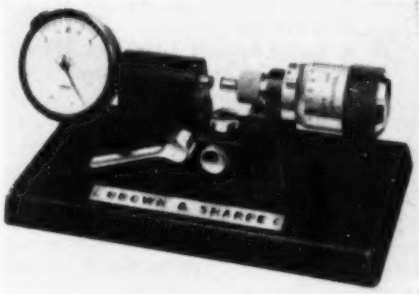
Syntron Selenium Metallic Rectifiers

on an insulated stud. Electric connection is made to the surface of the plates by a pressure spring contact washer. Washers are used to space apart the plates to allow free passage of air for cooling. The plates are processed in large sizes and then sheared to the desired size. Standard-size plates range from 1 x 1-inch to 6 x 12-inch; however, large plates up to 12 x 52-inches can be produced on special order. Two or more studs are used in stacking the larger plates to provide for rigidness and mechanical strength.

Bench Micrometer

Designated as the No. 245, an indicating bench micrometer announced by the Brown & Sharpe Mfg. Co., Providence 1, R. I., can be used in three distinctly different ways as follows: (1) the micrometer can be used to measure from 0 to ½ inch by 0.0001-inch graduations directly from the micrometer thimble; (2) it can be used as a comparator and set without additional standards, with readings to 0.0001 inch taken from a dial gage; and (3) it can be used to measure by 0.0001 inch directly from the dial gage with the micrometer set at the nearest 0.001 inch of the measurement. An adjustable meas-

Brown & Sharpe No. 245 Bench Micrometer



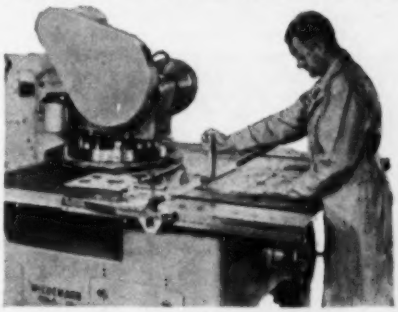
uring pressure from 8 oz. to 2 lb. that remains constant when set provides for standardized wire measurements at predetermined pressures.

The micrometer is equipped with tungsten carbide-tipped measuring surfaces for long use, and the threads are precision ground.

Turret Punch Press

Designated as the No. RA-41P, a turret punch press which is designed for the high speed piercing of such work as electrical panels, radio and television chassis, switchboards, and so on, has been announced by the Wiedemann Machine Co., 4219 Wissahickon Ave., Philadelphia 32, Pa. The turret of the machine accommodates 16 to 20 different punches and dies up to 3 inches in diameter. An easily accessible handwheel permits the turret to be quickly rotated for placing any desired punch and die in piercing position. The work to be pierced is clamped to a cross slide in proper relation to a template in which ¼-inch diameter holes have been accurately located to correspond with the center of each hole to be pierced in the material. A free-moving stylus is guided by the operator from hole to hole in the template, accurately positioning the material under the ram.

The press is capable of handling sheets up to 28 x 40 inches and provides a pressure of 15 tons with an 1½-inch stroke of the ram, which operates at a speed of 175 strokes per minute. The unit is powered by a 1 h.p., 3,450 r.p.m. motor.

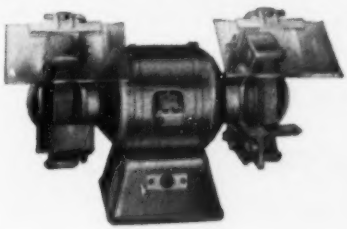


Wiedemann No. RA-41P Turret Punch Press in use

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The 1/3 hp motor that powers this Baldor Utility Grinder No. 6110 has no commutator, no brushes, no centrifugal switch —a really trouble-free motor that will not burn out even when repeatedly overloaded. Electronically balanced within 1/50 ounce of perfection, the armature rotates at 3400 RPM without vibration—an engineering achievement that makes true precision work possible. 36 and 60 grit wheels. **$50.00**



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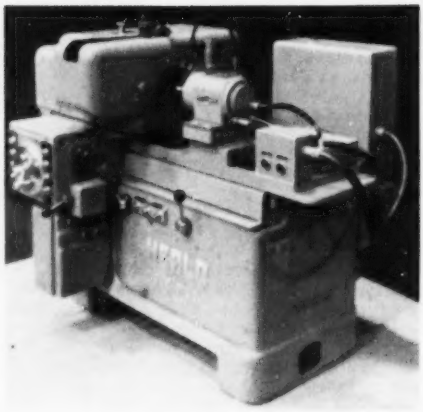
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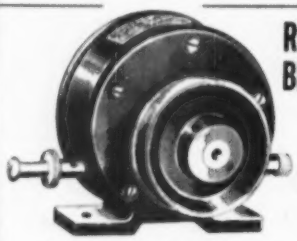
4380 Duncan Ave., St. Louis 10, Mo.

Battery-Type Internal Grinder

Designated as the Model 180, a centerless internal grinding machine featuring a central hydraulic system and designed for battery installation is now being marketed by The Heald Machine Co., Worcester 6, Mass. Central coolant supply adaption, as well as central power source for optional Hi-Frequency equipment, is also available. Where large volume production is required, the battery-type centerless internal grinding machine can be set up in groups whereby all machines are operated from a single central hydraulic power unit. Since the machines are completely automatic, several machines can be easily attended by a single operator.



Heald Model 180 Battery-Type Centerless Internal Grinder



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BUFFALO DENTAL MFG. COMPANY
Buffalo 3, N. Y.

Stamping Fixture

Designed as the Model PSF-10, a special stamping fixture designed for use in a small power press, screw press, or kick press for marking metal name plates in mass production operations has been developed by the M. E. Cunningham Co., 158 E. Carson St., Pittsburgh 19, Pa. The device is composed of a chase block which contains the steel marking letters and a striking block which is held in the throat of the press by set screws. The striking block is made of high-grade heat-treated tool steel with the shank machined to required specifications.

Slots for containing the letters are ma-



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1034 N. PLUM STREET LANCASTER, PA.
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS



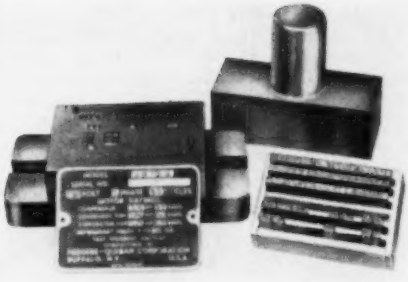
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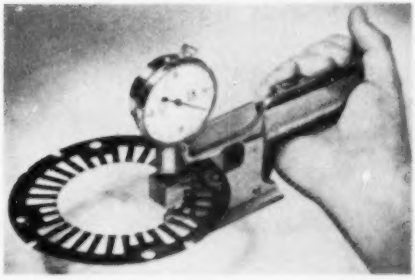
Cunningham Model PSF-10 Stamping Fixture

chined out of the chase block to comply with the setup of the name plate layout. When the same style plate is used for several different models, logotypes are supplied. The logotypes are engraved to precision standards to assure accurate alignment and even depth stamping and are easily changed by means of a small magnet or tweezers. The chase block is equipped with alignment pins so the plate can be set quickly into position over the type. The chase block is mounted on the press bed by means of a holder section which can be clamped or bolted in position.

Burr Gage

The B. C. Ames Co., 29 Ames St., Waltham 54, Mass., has announced a burr gage designated as the S-4930 which is designed to accurately measure the height of burrs on stampings of all materials. In operation, the gage is generally held vertically by means of the knurled handle, and a lever is squeezed, closing the two clamping surfaces of the gage which are rounded chisel in shape. The specimen then hangs in the gage in a vertical posi-

Ames S-4930 Burr Gage in use



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Super Finish Bore on Universal Drill Bushings Lengthens Bushing Life, Reduces Tool Breakage



To super finish I. D., add such plus features as blended radius, knurled head, I. D. break, chamfered O. D., and you have the reasons why Universal Drill Bushings are specified by many of America's leading manufacturers. Universal provides extra prompt sectional delivery and information from warehouses at 1060 Broad Street, Newark, N. J., and 5035 Sixth Ave., Kenosha, Wis. Write, call or wire today!

UNIVERSAL ENGINEERING COMPANY

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tion and the actual amount of burr shows on a dial in direct readings in one-half thousandths. Quarter thousandths can be easily estimated.

The lower chisel contact is supported by parallel reeds to ensure parallel motion of the chisel surfaces regardless of the thickness of the specimen. When the specimen is clamped between the chisels, the upper chisel crushes through the burr until it bears against the flat of the specimen, but is prevented from damaging the specimen due to the action of a cushion spring between the lower chisel and lever. The indicator contact then rests on the burr and the actual height of burr is shown on the dial.



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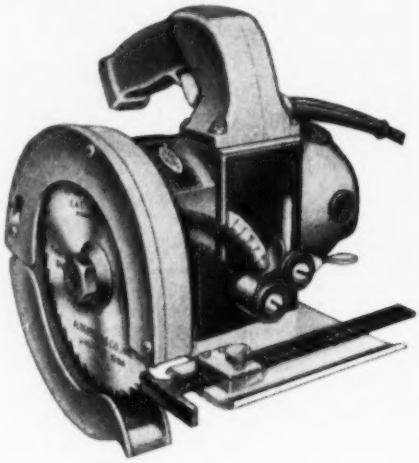
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KARL A. NEISE

381 Fourth Ave., New York 16, N. Y.

Electric Hand Saw

An electric hand saw, which can be equipped with blades for cutting a wide variety of materials, including non-ferrous metals such as aluminum, copper, brass, or lead, has been added to the line of "Sioux" tools offered by Albertson & Co., Inc., Sioux City 3, Iowa. The saw has an aluminum alloy body and is designed for convenient one-hand operation. An adjustable base for bevel cuts from 0 to 45 degrees and an adjustable scale guide provide for maximum versatility of the unit.



"Sioux" Electric Hand Saw

Other features of the saw include a universal a.c./d.c. 115-volt 8-ampere motor; ball and roller bearings throughout; heat-treated alloy steel helical gears; angle and depth adjustments; and a free saw speed of 5,300 revolutions per minute.

Conner TOOL & CUTTER CO.

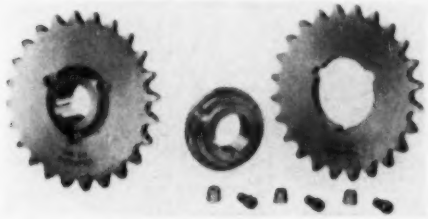
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DETROIT

Deep Holes—Exclusively

Interchangeable Hub for Disc Sprockets

Known as the "Grip-Master," an interchangeable hub for disc sprockets is now



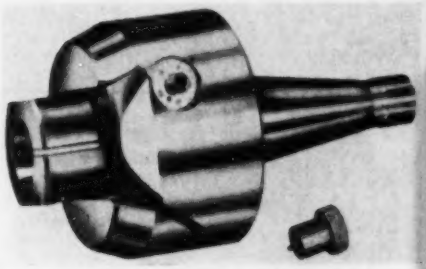
Cullman "Grip-Master" Interchangeable Hub for Disc Sprockets

being offered in a wide range of sizes by Cullman Wheel Co., 1352-V Altgeld St., Chicago 14, Ill. The hub is made of steel, bored, drilled and split ready to receive a plate sprocket, which, after being placed on the hub, is held in position by means of three cap screws inserted through taper bushings. Frequently, plate sprockets may be interchanged and mounted without removing the hub from the shaft.

Offset Boring Head

The Everede Tool Co., 2000-04 N. Parkside Ave., Chicago 39, Ill., has announced the marketing of an intermediate size offset boring head, known as the No. 3-50, which is 3½ inches in diameter and is said to have a maximum boring capacity of 4½ inches.

Designed for use in popular size vertical mills, jig boring machines, and turret



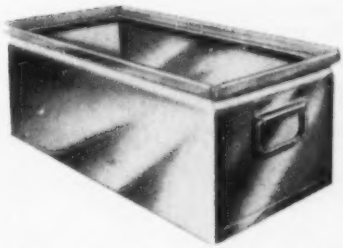
Everede No. 3-50 Offset Boring Head

lathes, the head is said to contain the versatile features of both the company's smaller and larger models.

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•

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Reinforced Corners • Drop Handle Each End • Spotwelded Construction • Four Rivets for Extra Strength • Continuous Stacking Rim All Four Sides.

Product Number	Width	Length	Height	Gauge Steel	Price Green
80ID-18	10"	16"	6"	18	$2.05

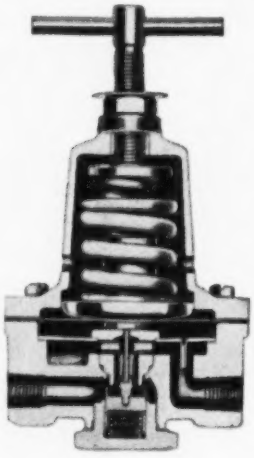
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BAY METAL PRODUCTS • 3015 N. 16th St., Philadelphia 32, Pa.

Liquid Pressure Regulator

Designated as the "Series 2H," a liquid pressure regulator designed for handling water, oil, and non-corrosive liquids up to a temperature of 200 deg. F. where close regulation of secondary pressure is desired is now being manufactured by the C. A. Norgren Co., 235 Santa Fe Drive, Denver 9, Colo. The regulator is said to reduce line pressures of up to 400 p. s. i. to closely-held working pressures of up to 250 p.s.i. in the following ranges: under 15 lb.; 15 to 50 lb.; 40 to 75 lb.; 75 to 125 lb.; 125 to 250 lb.; and 5 to 125 pounds.

Principal features of the regulator are the baffle plate and siphon tube action which permit maximum flow of the liquid with minimum pressure drop. The regulator is said to respond quickly to sudden demands for greater volume without excessive momentary pressure drop. The diaphragm is constructed of water and oil-resistant synthetic rubber reinforced with nylon cloth, and the dashpot chamber parts are designed to provide for maximum wear and corrosion resistance. The regulator is compact and is available in sizes ranging from 6 to 9⅛ inches high overall.



Norgren Series 2H Liquid Pressure Regulator

2:1 Hydraulic Cylinder

Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass., is now marketing, under the trade name of Gerotor, a hy-



M-D Facing Heads
With Automatic Feed

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse; feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

MUMMERT - DIXON CO.
120 PHILADELPHIA ST. HANOVER, PA.



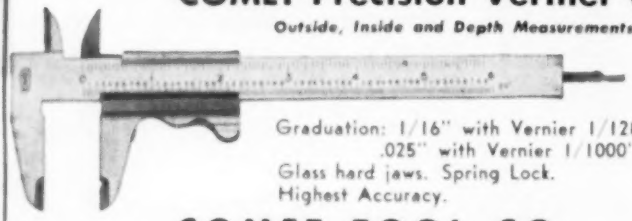
DRILL and PILOT BUSHINGS
Frictionless —Rotary

For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch.

Write for details.

GATCO ROTARY BUSHINGS CO.
1300 Mt. Elliott Ave. Detroit, Mich.

COMET Precision Vernier Caliper
Outside, Inside and Depth Measurements



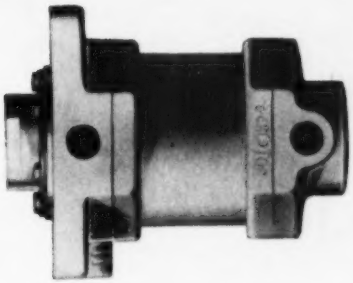
Meas. Capacity: 5⅛"

Graduation: 1/16" with Vernier 1/128"
.025" with Vernier 1/1000"
Glass hard jaws. Spring Lock.
Highest Accuracy.

Price **$9.75**
incl. leather case

COMET TOOL CO.
738 Broadway
New York 3, N. Y.

draulic cylinder of the 2:1 type with a piston rod twice in diameter to that of a standard size rod. Adaptable to a variety



Gerotor 2:1 Hydraulic Cylinder

of hydraulic circuits, the cylinder is particularly suited to such equipment as injection molding machines and hydraulic presses. The double-size piston rod is said to reduce the oil displacement within the cylinder due to its additional area, thus permitting the rod to retract at twice the speed that it extends.

Though the rod end flange mounting is employed most often, the Gerotor 2:1 Cylinder is also available in five other standard mountings (foot, trunnion, centerline, blind end flange, and clevis); in ten bore diameters; in any length stroke up to 96 inches; and with cushioning at either or both ends of the piston rod.

Soldering Tool

Known as the Ideal "Standard" Thermo-Grip, a 1,000-watt soldering tool which is said to require no preheating



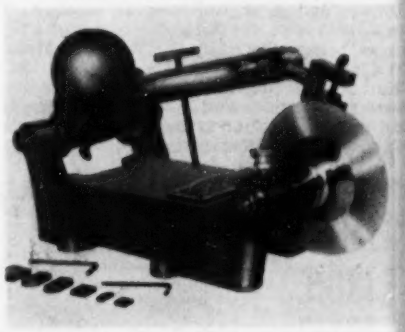
Ideal "Standard" Thermo-Grip

and draws current only when actually in use has been introduced by Ideal Industries, Inc., 1031 Park Ave., Sycamore,

Carbide Users

CAN NOW RESTORE BROKEN TOOLS AND CUTTERS QUICKLY AND INEXPENSIVELY WITH THE NEW IMPROVED MODEL No. 300

UNION CUT-OFF MACHINE



WHAT IT DOES:

Cuts broken sections off damaged carbide tools without grinding.
Cuts standard carbide blanks to any desired size.
Saves time-consuming grinding on carbide tools.
Saves carbide tools that otherwise would be scrapped.
Saves you money on costly diamond grinding wheels.
Saves you money by making possible the purchase of large-size standard carbide blanks.
Simple to operate and automatic in operation.

SPECIFICATIONS:

¼ H.P. motor, 1725 R.P.M. Overall size 7" x 12" x 8" high. Supplied complete with diamond cut-off blade and motor for $275.00 F.O.B. Stamford, Connecticut.

LITERATURE ON REQUEST

UNION
WIRE DIE CORP.

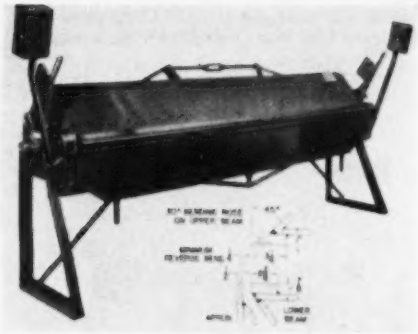
71 W. 45TH ST. N. Y. 19, N. Y.
PLANT: STAMFORD, CONN.

Ill. The unit concentrates heat at the point of contact, thereby heating only the portion to be soldered and thus minimizing the danger of melting nearby joints or burning other parts. When the tool touches the work, the secondary power circuit is completed and instant heat is provided.

Three attachments are available for handling all types of work. These attachments include a plier attachment for sweating and unsweating copper tubing, soldering lugs, terminals, and so on; fork attachment with two 3-inch electrodes for reaching into restricted areas such as switch boxes, electrical tools and equipment; and pencil attachment with one 3-inch electrode for spot soldering and light seam soldering.

Straight Bending Brake

Simplified and unitized in design, a bending brake for straight bending only is now being offered by the Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill. The construction includes triangular box sections on upper and lower beams (jaws) and apron, further stiffened with sturdy rod trusses. As shown in the illustration, the brake has a wide gripping area and arrangements for making reverse bends as close as ¼ inch by removing the inset plate on the apron.



Whitney Straight Bending Brake

The unitized design of the framework and castings supporting the clamp mechanism and apron pivots permits easy replacement when worn or damaged. The brake is available in sizes from 4 through 10 feet and in 18 through 12-gauge capacities.

MARK IRON, STEEL and CARBIDES



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Original Electric Etcher. Thousands in Daily Use

Mark *hardened parts*, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

• *Write for circulars and prices.*

BREWSTER-SQUIRES CO.

P. O. Box 191 Tenafly, N. J.

Memo re: STEEL STAMPS & MARKING DEVICES

That Newco bevel on New Method's does a swell job of giving clear markings with less effort and longer stamp life.

Better get a copy of their catalog and look it over for ways and means to cut our marking costs.

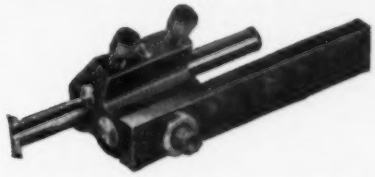
Write to:

NEW METHOD STEEL STAMPS, Inc.

149 Joseph Campau, Detroit 7, U.S.A.

Boring Bar Holder

Known as the "Timekut," a boring bar holder which can be quickly and easily



"Timekut" Adjustable Boring Bar Holder

adjusted to any desired boring or threading position without the use of shims has been placed on the market by Resinger Mfg. Co., 333 Thomas Ave., Rochester 17, N. Y. The holder is designed to accommodate various diameters of boring bars between two V- shaped jaws of sufficient length to insure a firm grip.

New File Package

According to an announcement made by the Simonds Saw & Steel Co., 470 Main St., Fitchburg, Mass., the "Red Tang" files marketed by this firm are now being packed in a distinctive all-red box with special top and end labels. This package is designed for "family resemblance" to other Simonds red trade marked, red packaged products and provides for easier identification of these machine shop and saw sharpening files.

Vernier Caliper

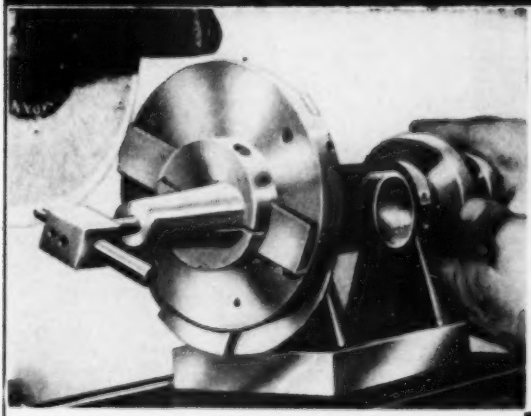
Marketed under the trade name of "Helios," a vernier caliper for making inside, outside, and depth measurements to 0.001 inch or 0.1 mm. has been announced by Karl A. Neise, 381 Fourth Ave., New York 16, N. Y. The caliper



"Helios" Vernier Caliper

incorporates an English scale graduated from 0 to 6 inches and a metric scale graduated from 0 to 150 millimeters.

Precision Grinding Wheel Dressing Made Easy!



• The LAST WORD Wheel Dresser's unsurpassed compactness are rigidity of construction gives you long life and durability.

This unit is designed to accurately dress any form or curvature needed for utmost precision grinding, also angle tangent to convex or concave radius.

Simplicity and accuracy makes this unit the LAST WORD in precision wheel dressing the world over.

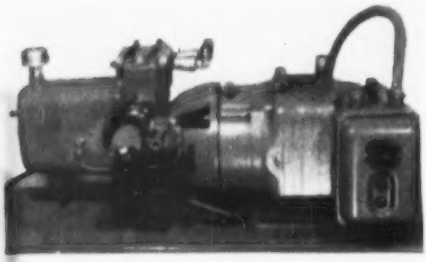
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Simplicity of Setting • Long Life • Safe • Shortens Dressing Time • Dresses Wheel at Grinding Point of Contact • Large Bearing Surfaces

LAST WORD SALES and ENGR. CO.
BOX 287 • ROYAL OAK, MICH.

Hydraulic Pumping Unit

Designed primarily for use with its special automatic hydraulic machines, a hydraulic pumping unit which is said to



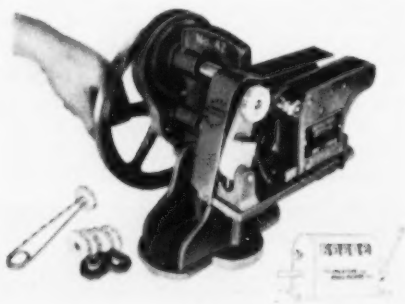
Harco 2 H.P. Hydraulic Pumping Unit with 3.3-gallon capacity

minimize pressure flutter and heating due to the maintenance of pilot pressures with large volume installations has been introduced by Harco Industries, Inc., 20 Curtice St., Rochester 5, N. Y. The unit is available in 118 models from 1.8 to 8.25 g.p.m. and in pressures up to 1,000 p.s.i. A totally-enclosed motor ranging from ½ to 5 h.p. with manual, electro-pneumatic, or hydraulic controls is incorporated in the pumping system.

According to the manufacturer, the unit, which can be easily adapted to a wide variety of machinery, includes a motor, solid coupling, vane-type pump, reservoir, oil cooler, air filter, overload valve, pressure regulating valve, and 3 or 4-way valve or combination of both.

Number Printing Machine

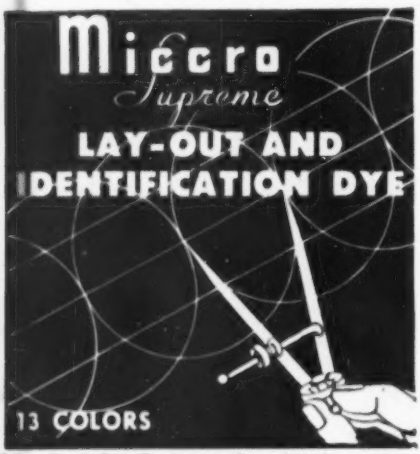
Designated as the No. 42, a machine designed for printing numbers on the peripheral faces of counter wheels, speedometer wheels and indicator wheels has been announced by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. The machine is claimed to accurately print 9 to 12 wheels per minute when hand operated,



Acromark No. 42 Number Printing Machine

and with motor drive the printing speed can be increased to that of the operator's ability to feed. The machine is supplied complete with ink fountain that will accommodate enamel or special printing ink. The figure printing wheels are constructed of synthetic acid-resistant rubber, molded in rolls to steel hubs to provide for easy and accurate assembly.

In operation, the wheel to be printed is placed on a protruding mandrel that is pin or notch-spotted for locating. The printing roll is geared to the mandrel so that a controlled imprint results as the drive wheel is turned. To facilitate feeding and positioning, the mandrel that carries the wheel to be printed moves away from the printing roll after each rotation, and a cam arrangement provides for a dwell long enough to permit removal of the printed wheel and the loading of another wheel.

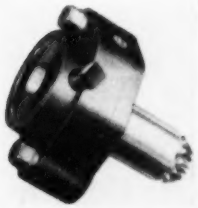


For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Ave. • Detroit 7, Mich.

Deep Hole Drilling Tool

Designated as the Model D-A, a deep hole drilling tool designed for use with automatic screw machines in performing drilling operations in which the holes to be drilled are four or more times deeper than the diameter of the drill has been announced by the Boyar-Schultz Corp., 2120 Walnut St., Chicago 12, Ill. The tool is designed with an oscillating action in the head that breaks the chips into small particles, allowing them to dissipate along the flutes of the drill. This action minimizes the amount of "pullouts" when drilling deep holes. The tool is also adjustable to compensate for possible misalignment between the turret and spindle of the machine.



Boyar-Schultz Model D-A Deep Hole Drilling Tool

According to the manufacturer, free machining stainless and commercial tool steels may be drilled without pullouts to a depth approximately 7 to 10 times the diameter of the drill while with brass and aluminum, a depth of 10 to 12 times the drill diameter is possible. The tool is available in three sizes for No. 00, No. 0, and No. 2 automatic screw machines and is also adaptable for use on multiple spindle machines.



"Mijit" Drill Jig

Drill Jig

Designed to reduce loading and unloading time to a minimum, the "Mijit" Drill Jig shown herewith is now being marketed by the Esco Engineering Co., 13413 Euclid Ave., Cleveland 12, Ohio. Diversified jobs are said to be readily handled with the jig by simply changing bushing plates. The jig is available in various sizes.

FASTER precision TAPPING with fewer "rejects!"



Tap holder is lighter, smaller in diameter. Affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

Exclusive! PROCUNIER "Tap Saver"

Procunier High Speed Tap Head Shows Consistently Better Performance

Here is the secret . . . here's why Procunier Tap Heads turn out precision tapping with fewer rejects, fewer broken taps: Tap driving pressure is *automatically regulated* by the amount of pressure applied to the unique Procunier clutch. An operator can quickly detect dull or "loaded" taps—by the pressure needed to drive them. Blind tapping is done as easily as through tapping! Improved features include: heat treated gear mechanism for long, trouble-free life; ball bearings for lifetime accuracy; simple, one-hole lubrication system . . . as well as many others. WRITE TODAY for illustrated brochure giving complete details, specifications and prices. Simply fill in and mail the coupon right now.

Also available — NEW! Procunier "TAP KING" for large hole tapping. Capacity —⅜" to 1" in steel; 1⅛" in softer metals.

PROCUNIER
Safety Chuck Co.
Dept. 11, 12 S. Clinton St.
Chicago 6, Illinois

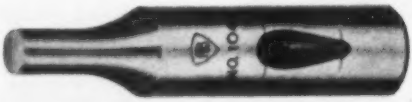
Procunier Safety Chuck Co., Dept. 11
12 S. Clinton St., Chicago, Illinois

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name .....
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City ..... Zone ..... State .....

Interchangeable Steel Punch

The Richard Brothers Division, Allied Products Corp., 12677 Burt Road Detroit 11, Mich., has introduced an interchangeable round punch made of high speed steel which is available in a wide variety of standard sizes for piercing various thicknesses of metals. High speed steel punches of special shapes or sizes can also be made to user specifications.

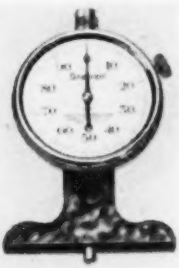


R-B Interchangeable High Speed Steel Punch

The punch incorporates an interchangeable feature in which a ball bearing lock in the retainer of the punch engages in a ball seat on the punch shank, thus providing secure positioning.

Dial Depth Gage

Designated as the No. 644, a dial depth gage designed for measuring the depth of holes, slots, recesses, and so on, ranging from 0 to 3 inches deep has been announced by

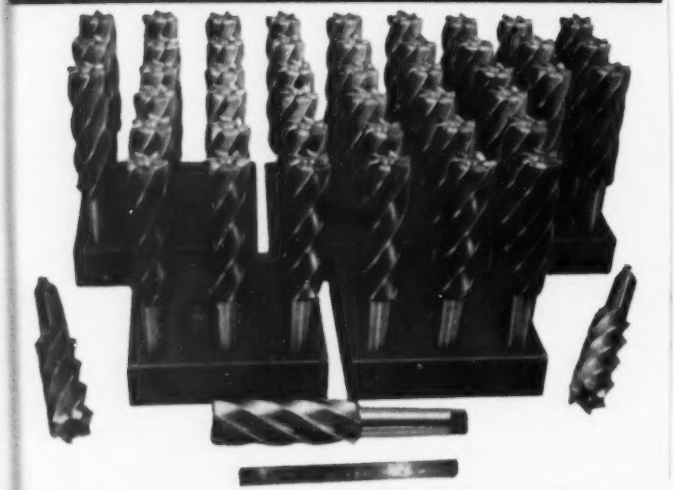


Starrett No. 644 Dial Depth Gage

The L. S. Starrett Co., Athol, Mass. To use the gage, the flat base is positioned on the top surface of the work, allowing the rod to enter the hole or recess to its full depth. The measurement automatically registers directly on a dial indicator in thousandths of an inch.

The base of the instrument measures 2½ inches long x ½ inch wide and is hardened, ground, and lapped within close tolerances. The gage is furnished with a ¼-inch long rod; other rods made.

YESTERDAY'S PIONEER . . . TODAY'S LEADER



HERE'S A SINGLE ORDER—48 Large Special

WELDON End Mills

The 48—*Count 'Em!*—48 special large WELDON end mills above represent a single order shipped to one of our enthusiastic customers. These are special husky, fast metal-removing WELDON end mills built for sturdy dependable service. This customer orders in lots like this because he realizes that his profits depend in part on the use of WELDON end mills, noted for their quality, accuracy and fast-cutting performance.

Weldon Distributors throughout U. S. A. and Canada carry complete stocks to serve you.

THE WELDON TOOL CO. Cleveland 4, Ohio

3000 WOODHILL ROAD

Welding Ground Clamp

Designated as the GC-3, a lightweight ground clamp has been developed by The Lincoln Electric Co., Dept. 253, Cleveland



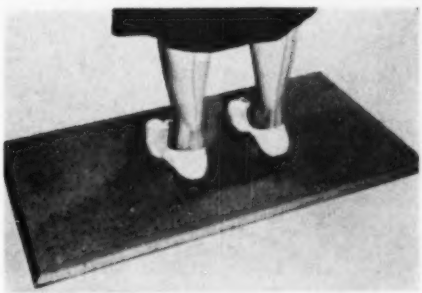
Lincoln GC-3 Welding Ground Clamp

1, Ohio, to provide a convenient readily movable, yet solid ground connection for welding operations where currents do not exceed 300 amperes. The clamp weighs 1½ lb. and has a jaw spread of 2½ inches. A direct-acting spring is said to afford a positive, slip-proof connection with the work.

The frame of the clamp is of pressed steel construction, and the jaws are made of a special steel and copper alloy which is said to be highly conductive and resistant to wear.

Floor Mat

Known a the "Lam-Tex," a synthetic rubber floor mat designed to reduce employee fatigue from standing for long periods of time has been introduced by Burgess-Berliner Associates, St. Charles, Ill. The mat is porous and springy, and is said to resist rotting caused by age,



Burgess-Berliner "Lam-Tex" Synthetic Rubber Floor Mat

moisture, oils and chemicals. The pad measures 20 x 36 x ½ inch overall and has beveled edges.

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NIBBLING MACHINE

NIBBLE YOUR COSTS

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Capacity ¾" mild steel

FOR TUBE SLOTTING, TUBE SHAPING AND CUTTING FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE.

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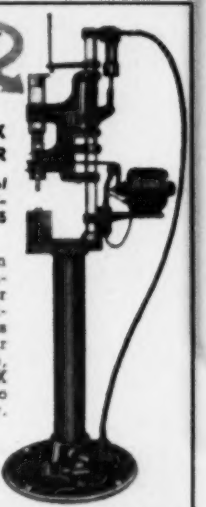
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Greatest RIVETING IMPROVEMENT in years!

AIRFLEX PNEUMATIC RIVETER

with automatic control SPEEDS UP PRODUCTION . . . INCREASES PROFITS . . .

For light riveting on Glass, Plastics, Leather, Wood, etc. . . . or for heavy duty capacity on metal and alloys . . . or whatever your requirements may be, there is an AIRFLEX Pneumatic Riveter to do the job efficiently.



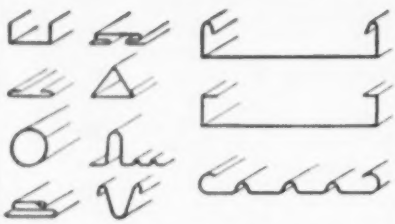
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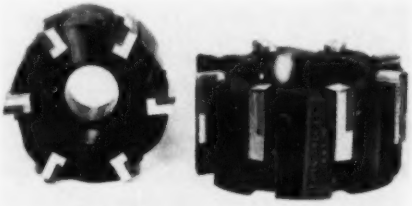
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Garson - Newton Co.
61-71 MILL ST.
BELLEVILLE, NEW JERSEY



Carbide-Tipped Shell End Mill

A carbide-tipped inserted-blade shell end mill for the efficient milling of cast iron, brass, and so on, has been designed



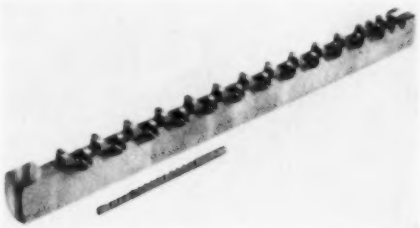
Super Carbide-Tipped Shell End Mills

by Super Tool Co., 21650 Hoover Road, Detroit 13, Mich. The cutter is available to standard specifications in 3, 4, 5, and 6-inch diameters, in right-hand only, the number of blades in each case being twice the diameter. The carbide-tipped, replaceable, serrated back blades are firmly held and easily adjusted, and are sturdily constructed to ensure maximum rigidity at high table feeds, as well as long and trouble-free production life.

Keyway Broaches

The du Mont Corp., Greenfield, Mass., has announced the addition of two new large size broaches for cutting $\frac{7}{8}$ and 1-inch keyways to its "Minute Man" line of keyway broaches, which now includes sizes for cutting keyways from $\frac{1}{16}$ to 1 inch.

The new large broaches include staggered teeth to provide ample chip room for heavy cuts in long bores. The cutting teeth are ground with a sufficient number



du Mont "Minute Man" 1-Inch and 1/16-Inch Broaches

of chip breakers to reduce the amount of pressure required to push each broach through the bore.

Shelf Hangers

Designated as the "Add-A-Pair," a line of hangers designed to accommodate storage shelving for a wide variety of materials and products is now being offered by Ambler Distributors, Ambler, Pa. Constructed of ¼-inch Bethanized steel wire, the hangers, it is claimed, will not burn, sag, warp, or twist. The hangers require only 8 penny nails for installation and are so designed that extra shelves may be easily added to those already installed. According to the manufacturer, multiple installations of the hangers can support up to 1,000 lb. of pipe, paints, boxes, files, and so on. Shelves as wide as 12 inches may be created.



Reid Malleable Machine Handles

Malleable Machine Handle

A malleable machine handle is now being manufactured by the Reid Tool Supply Co., 709 Baker St., Muskegon Heights, Mich. Made in three styles—c r a n k, straight, and offset—and in various sizes ranging from 4 to 18 inches, the handle is sufficiently strong to withstand heavy usage and, it is claimed, will not break if accidentally struck a sharp blow. The handle is readily machinable and is ductile enough so that the user can make additional bends in it when necessary to suit his requirements.

Extension Bed Gap Lathes



Illustrated is the Series "AG" 20/40" Extension Bed Gap Lathe. Also made in 28/50" Heavy Duty.

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe.
We also manufacture a line of regular geared head engine lathes.

Write for circulars.

The Nebel Machine Tool Co.

Easily Operated, Dependable

HAND BENCH SHEAR

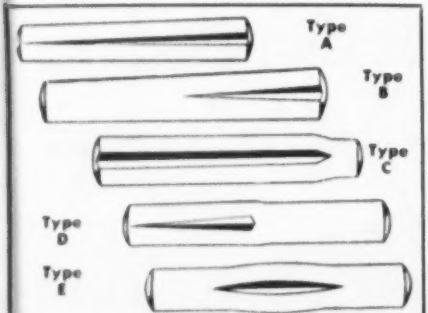


You get fast slitting of long sheets, cutting of steel bars and 1/8" angle iron with this handy bench shear. Profitably used throughout industry for years. Capacity 3/16 x 2" bars; 10 gauge sheets.

Write for folder.

W. A. WHITNEY MFG. CO.

640 RACE ST. ROCKFORD, ILL.



GROOVE PINS

Gillen groove pins, expanded by three longitudinal grooves (see 5 types in sketches) provide necessary pressure to hold machine parts permanently. Pins may be driven from hole for reuse without damage to pin or hole. Made of either B-1112 or B-1113 steel and zinc plated. Also available in stainless, alloy steel, monel metal or brass.

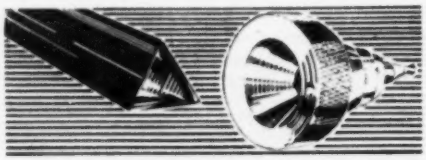
Write for circular and prices.

JOHN GILLEN CO., INC.

2542 South 50th Ave. Cicero 50, Ill.

Center Drill Chuck

Designated as the "Time Saver," a center drill chuck which is said to fit any live or dead 60-degree center has been



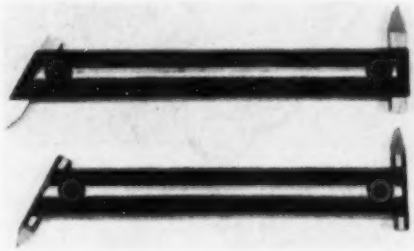
"Time-Saver" Center Drill Chuck

announced by Heldie's Machine Works, 39 S.E. 25th St., Oklahoma City, Okla. The chuck is said to eliminate the necessity of moving the tailstock twice on lathe center or the drill chuck, the tailstock center is merely screwed back approximately 1 inch. Gripping of the annealed body of the chuck is said to prevent the chuck from turning while drilling.

Boring Bar

Known as the "Shuregrip," a boring bar available in single and double-end types with 30 and 90-degree angles has been announced by J. E. Freyman & Sons, Inc., Dept. MMS, 3627 Keswick Rd., Baltimore 11, Md. The double-end type bar is available in diameters ranging from $\frac{5}{8}$ to $1\frac{1}{2}$ inches and in lengths of from 7 to 23 inches. This type is designed to accommodate $\frac{1}{8}$ and $\frac{3}{16}$-inch round and $\frac{3}{8}$ to $\frac{1}{2}$-inch square cutters.

The single-end type bar is available in diameters of from $\frac{5}{8}$ to $\frac{3}{4}$ inch and in lengths ranging from 3 to 10 inches. It will accommodate $\frac{1}{8}$ and $\frac{3}{16}$-inch round

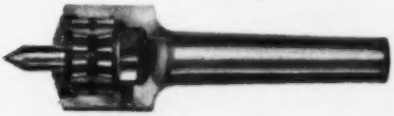


"Shuregrip" Boring Bars

and $\frac{3}{8}$ to $\frac{1}{4}$-inch square cutters. A hexagon wrench is furnished with each type of bar.

Live Center

Equipped with No. 3 precision Timken roller bearings and designed to accommodate changeable tapered inserts, the



Arrow Live Center

Arrow Live Center illustrated herewith, product of Arrow Tool and Reamer Co., Detroit 9, Mich., also features a simple adjusting screw that permits adjustment for wear. The double-cone single-cup type bearings are said to accommodate both thrust and radial loads.

The center is available in Nos. 1, 2, 3, 4, and 5 Morse tapers in both general purpose and heavy duty types.

Electric Drill

Stanley Electric Tools, 520 Myrtle St., New Britain, Conn., has announced a small ¼-inch electric drill of lightweight, compact design with ample power for drilling in metal and other materials. Features include a strong aluminum die-cast housing; three-jaw Jacobs hex key chuck; trigger type switch with locking device; helical alloy steel gears, and so on.

Designated as the No. 14, the drill has a capacity of ¼ inch in steel and ⅜ inch in wood and is availble for operation on 115, 125, and 150 volts. The tool, which has



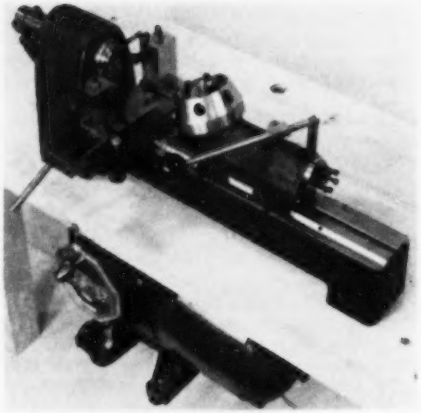
Stanley No. 14 Electric Drill

a no-load speed of 1,100 r.p.m., measures 8¼ inches long overall and weighs 3 lb. net.



Heavy-Duty Lathe

Known as the "Elect," a heavy-duty lathe which is heavily and sturdily constructed to meet the requirements of modern carbide-tipped cutting tools for production work on small precision parts is now being produced at F. W. Derbyshire, Inc., 157 High St., Waltham 54, Mass. The lathe has a 22-inch bed and is provided with a double-row ball-bearing headstock with spindle speeds up to 12,000 r.p.m. A foot treadle-operated spring-bind collet closer is easily opened and closed when the spindle is rotating or idle, thus providing the operator with the free use of both hands for handling work.



Derbyshire "Elect" Heavy-Duty Lathe

The lathe is designed to accommodate standard "Magnus-Elect" wire chucks with a capacity of from 0.004 to 0.315 inch. The distance between the centers is 12 inches, and the swing is 6⅞ inches. A semi-automatic four or six-position turret with ⅝-inch holes to accommodate standard shank tools is available as an attachment for the lathe.

Exchangeable Hollow Center

The Cosa Corp., 405 Lexington Ave., Chrysler Bldg., New York 17, N. Y., is now marketing, under the trade name of "Dero," an exchangeable hollow center for lathes, milling machines, grinding machines, and so on. The unit incorporates an exchangeable center disc with 16 centers distributed over its circumference. Each group of eight centers is

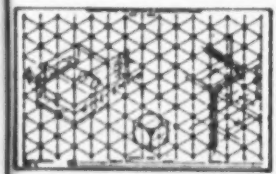
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A **complete** cam cutting service for both large and small cams is offered by our **ROWBOTTOM** and **DALY** cam milling facilities.

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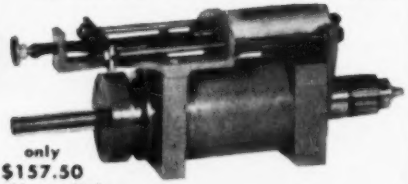
Wade Instrument Co. Dept. H, R.F.D. #1 Chardon, Ohio

HYPNEUMAT

3½" Stroke
Drilling Capacity ⅜" in steel
Tapping Capacity ⅜" in steel

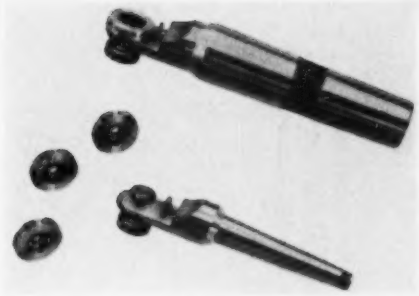
A single package power unit that operates on compressed air or hydraulic power, offers one stroke and continuous automatic cycling—dwell drills—deep hole drills—precision bottom drilling and tapping—speeds up to 20,000 R.P.M. *Write for illustrated literature.*

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only **$157.50** for Master Unit

HYPNEUMAT INC., 647 W. Virginia St., Milwaukee 4, Wisconsin



"Dero" Exchangeable Hollow Center

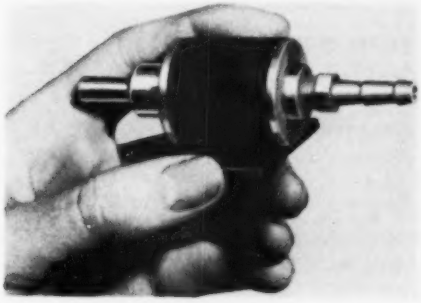
exactly opposite the other group. A springy index point allows engagement of a center which is then fixed by a screw. If the opposite center is worn out, it can be quickly replaced by releasing the fixing screw and turning the center disc by $\frac{1}{8}$th of its circumference, whereupon the index point again snaps in and the screw is tightened. If eight centers are worn out, the whole center disc can easily and quickly be exchanged by releasing a screw and nut.

The center can be used for turning, milling, round surfacing, and thread grinding operations on all machine tools on which workpieces with centers of 60 degrees are machined. The center is available with Morse tapers Nos. 1, 2, 3, and 4. The center disc is available with centers ranging from 0.5 to 3 mm. in outer diameter of taper.

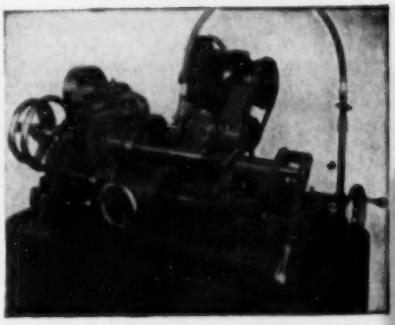
Miniature Air Cylinder

Air-Mite, 2651 W. Lake St., Chicago 12, Ill., has announced a Micro Model Air Cylinder for use in small jigs and fixtures

Air-Mite Micro Model Air Cylinder



WALTHAM
Thread Miller

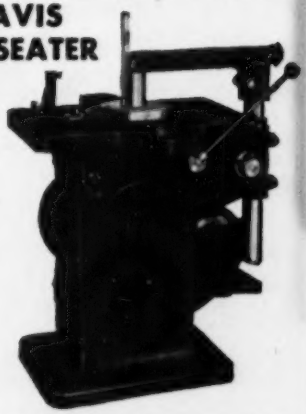


Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.

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to cut Keyways when a
DAVIS KEYSEATER
will do the job so much quicker and better?



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where size and space limitations are primary factors. Despite its small size, the cylinder is said to deliver a 75-lb. thrust on a 100-lb. line pressure. The stroke is ⅝ inch, with equal ram pressure at any stroke point.

The cylinder, which is machined from solid brass bar stock, can be used for the ejection or injection of work; for holding or clamping parts for welding, riveting, drilling, bolting, and so on; or for any other processing or assembling operation where speed and accuracy are essential. Any number of cylinders from one to several hundred can be operated by a single control valve.



All standard sizes carried in stock for immediate delivery. Special cutters made to Blue Print.

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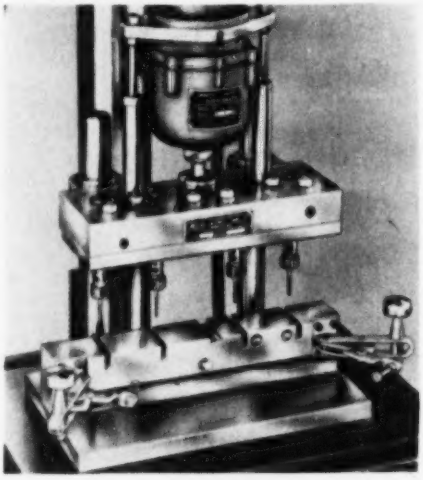
QUALITY TOOL WORKS

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Multiple Drilling and Tapping Unit

The Charles L. Jarvis Co., Middletown in Connecticut, has announced a "Multi-Tapper" for multiple tapping and drilling



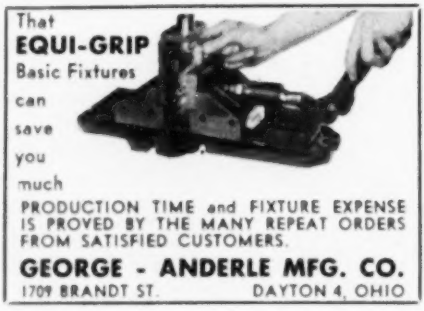
Jarvis "Multi-Tapper"

in mass production lines. The unit features a silent roller chain to transmit power from a "Torqomatic" drive unit. The chain is said to withstand constant friction and to absorb the unusually heavy shock loads caused by continuous forward and reverse action.

The number of spindles accommodated by the unit is limited only by the size of the tap or drill and the work.

Jaw-Head Rawhide Hammer

A jaw-head hammer with replaceable rawhide faces, designed for assembling, shaping, adjusting, and dismantling parts





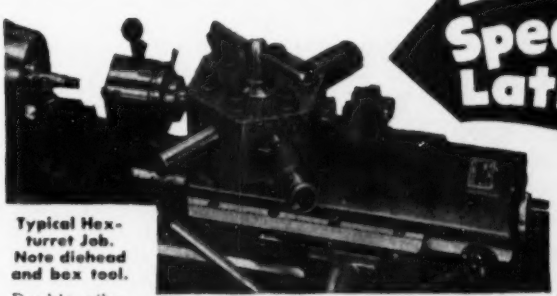
Chicago Jaw-Head Rawhide Hammer

without surface or other injury, has been placed on the market by the Chicago Rawhide Mfg. Co., 1207 Elston Ave., Chicago 22, Ill. The hammer is sufficiently light to allow for gentle tapping or sharp light blows and can be used safely in cramped spaces without injury to adjacent parts.

The rawhide faces of the hammer can be readily replaced when necessary by simply loosening a nut, slipping a new face between the adjustable jaws of the hammer head, and then retightening the nut. The faces, it is claimed, will not become soft or brittle under extremes of heat or cold, will not chip, and will not load up with metal particles, mark or discolor finished surfaces or spark against metals.

Grinder-Miller

Designated as the "Super 50," a portable electric grinder-miller designed for precision grinding, milling, small diameter drilling, finishing, and micro-finishing operations on small parts in production is now being manufactured by the Precise Products Co., 1345 Clark St., Racine 11, Wis. The grinder-miller utilizes a heavy-duty precision quill in a chrome-nickel housing which is machined inside and outside. The quill, which is said to be accurate to 0.0001 inch, is mounted



Typical Hex-turret Job. Note diehead and box tool.

Speeds Rush Lathe Jobs!

ENCO Self-Indexing Hex-Turrets for 9" to 16" lathes

Double gibs.
Double drive gears and racks.
Ground and spotted slide ways.
All working parts hardened.
Smooth and sensitive control with pilot wheel adjustment.
Easy stop screw adjustment.
Clamps from top of ways.

Write for catalogue No. 50 and quotation giving make of lathe and size.

Model No.	Delivery	Tool Holes	Stroke	Price	For Following Lathes
425	2 weeks	1"	4¼"	$275.00	Atlas, Logan 9", 10" & 11", Clausing, South Bend 9" & 10", Sheldon 10", 11" & 12" Craftsman 12", Powr Kraft 10" and Sebastian 12".
651	2 weeks	1"	6½"	350.00	
650	2 to 6 weeks	1¼"	6½"	400.00 to 600.00	South Bend 13", 14½" & 16", Regal 13", 15", 17" & 19", Sebastian 14" & 16", Cintilathe 13", 15" & 18".

ENCO MANUFACTURING COMPANY
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Mfrs. of Enco Turret Tool Posts for All Lathes and Miti-Mite Magnetic Base Holders



Eliminate
Chip Breaker
Grinding
with

EVEREDE

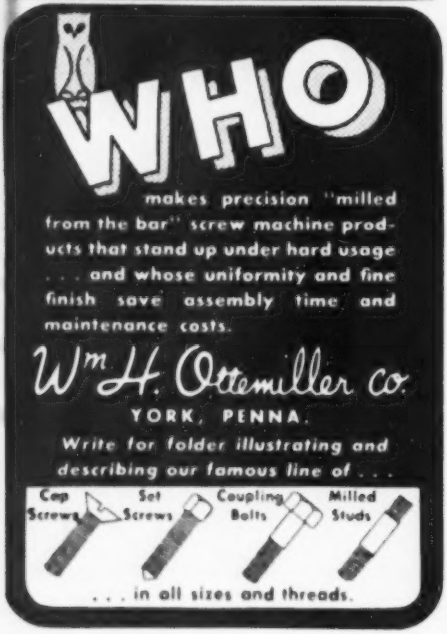
Adjustable Chip Breaker

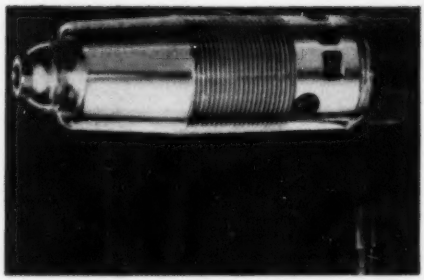
New EVEREDE Carbide tool holder utilizes triangular shaped Solid Carbide Tool Bit with an Adjustable Chip Breaker ... Successfully! You save grinding time and diamond grinding wheel expense when tools are sharpened ... a money-saving ECONOMY!

Write NOW for Complete Information

EVEREDE TOOL CO.

2004 N. Parkside Ave. Chicago 39, Illinois





Precise "Super 50" Grinder-Miller

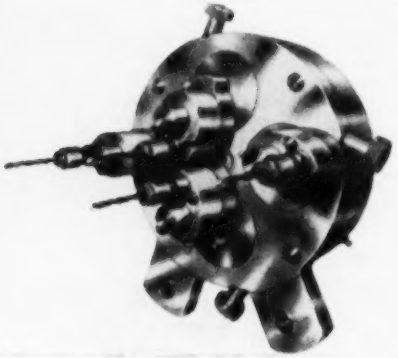
on one regular size micro-precision and two oversize ball bearings, all of which are lubricated and sealed for life.

The grinder-miller, which develops up to ¼ h.p. at the chuck, operates from a 115 d.c./a.c. motor and has a load speed range of from 20,000 to 45,000 r.p.m. The unit is said to be capable of driving mounted wheels up to 1¼-inch in diameter unmounted wheels, cutoff wheels, and metal saws up to 2 inches in diameter x ¼-inch in width; and high speed steel and tungsten carbide midget mills up to ⅜-inch in diameter x 1-inch in width.

Adjustable Drilling Head

Errington Mechanical Laboratory, Inc., Staten Island 4, N. Y., has introduced a fully adjustable drilling head which can be used in drilling holes in square, rectangular, circular, triangular and irregular pattern. Light and compact, the head is fully geared and is said to afford a

Errington Fully Adjustable Drilling Head



wide range of adjustment. Needle bearings are utilized wherever possible, and grooved ball thrust bearings are provided on all spindles. All moving parts are hardened.

The drilling head is constructed with 3, 4, and 6 spindles and in sizes from 0 to ¼ inch, 3/16 to ½ inch, and with No. 2 M.T. socket capacity.

Self-Positioning Groove Gage

Manufactured under the trade name of "Nilco," a self-positioning gage designed for accurately measuring internal groove diameters and recesses used for precision retaining rings of the Truarc type, snap rings, O-rings, oil and washer grooves, and so on, has been announced by the Nilsson Gage Co., Poughkeepsie, N. Y. The nose of the gage has two extensions, the upper extension containing a gage pin located between two prongs of a one-piece plunger. The prongs, having a 60-degree chamfer and a flat edge slightly less than the groove width, center the pin in the groove and position the pin axis accurately through the center of the bore.



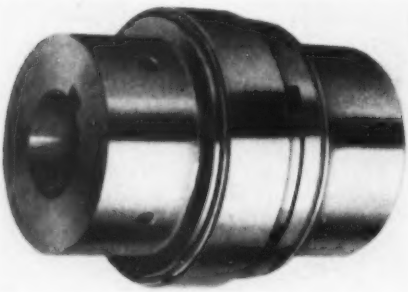
"Nilco" Self-Positioning Groove Gage

The lower extension, having a fixed gaging insert, is pulled in by a trigger when the nose is inserted into a housing. When the trigger is released, the groove is located almost instantaneously. A dial indicator which is calibrated in 0.0001, 0.00025, or 0.0005 mm. provides quick, accurate readings.



Improved Flexible Coupling

The Lovejoy Coupling Co., 5007 W. Lake St., Chicago 44, Ill., has announced improvements in its flexible coupling in



Lovejoy Improved Flexible Coupling

the Types "C" and "H" which provide for easier installation and larger bore capacities. The improved coupling is designed for use on motor-driven or engine-driven pumps, compressors, generators, pulverizers, and almost all machinery of 50 to 1,000 horsepower.

The inside sleeve of the improved coupling is made in two parts, providing a sleeve in each body, and both bodies are machined alike for the removable steel collar which is held in place by a snap-ring and can be used on either half of the coupling.

According to the manufacturer, the improved coupling will instantly adjust for misalignment, shock, vibration, oscillation, surge, or backlash. In addition, half of the cushions are idlers (except on reversing load); thus, there is always a set of new cushions in the coupling so that load cushions can be quickly interchanged without tearing down the coupling. The coupling is available with several types of cushion materials, each of which is adapted to a particular service.

Air Motor

The manufacture of a Series BSSM "Super Speed" Air Motor in several mounting styles has been announced by The Bellows Co., Akron, Ohio. Essentially a double-acting air cylinder developing unusually high piston rod speed and power from normal operating air pressure, the motor is said to be ideally suited to a wide range of staking, riveting,

ONE-OF-A-KIND SPRINGS IN 60 SECONDS

•

NO LATHE NECESSARY

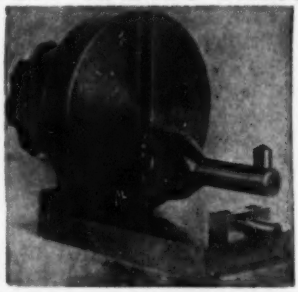


1. 60 second action for a spring 12" long.
2. Ideal for tool room, research lab. and repair shops.
3. Mandrel capacity to 1⅛".
4. Wire capacity up to .229" diameter.
5. Pitch capacity up to 1".
6. Clamps in your bench vise.

Price $39
Other small shop sizes from $20
For 10-Day FREE TRIAL, tear ad out and mail to:

MONTGOMERY & CO., Inc.
Since 1876
49 Park Place, N. Y. 7, N. Y.

SAFETY RADIUS DRESSER



• Key tool men are safe from sparks and flying grit because this dresser works beneath the wheel, and the wheel guard can always be left in place. • Capacity: concave, 2½"; convex, 1⅜". Maximum wheel size 8". • Overall dimensions: 6" x 6" x 3" wide. Weight 16 lbs. • Price with diamond $85.00.

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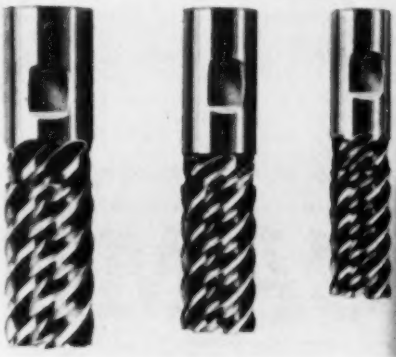
forming, swedging, stamping, and punching operations or for such work as the quick cutting of continuously moving material or similar operations where high piston rod speed and power are required.

The motor is made in two bore sizes of 2½ and 3⅝ inches equipped with either a manually operated valve or Electroaire valve for synchronized electrical control. Standard stroke lengths are 4, 6, 9, and 12 inches for both bore sizes, with special stroke lengths available on order.

End Mill

The Shearcutter End Mill is ground Dept. MM 28, Reseda, Calif., has developed a Shearcutting type end mill which is said to apply the rotary broaching technique to milling machine operation. Supplied in all standard sizes and types, with special sizes available, the tool is made from high speed steel and features a helical cutting edge which has an extremely large angle compared to the axis of rotation, thus providing the desired Shearcutting action on the metal being removed. Flats are provided on the straight shank types so that set screws may be used to lock the tools in position to resist end thrust.

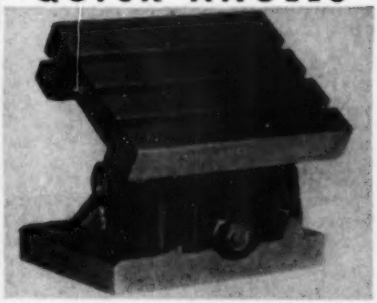
The Shearcutter End Mill is ground from the solid after being hardened to a Rockwell C reading of 63 to 65. Designed with an extremely deep counter-



Shearcutter End Mills

bore on its cutting end, the mill can be readily resharpening when it becomes dull, thus providing for unusually long life.

QUICK ANGLES



Quickly set up for any angle between 0° and 90°. Made of normalized grey iron. Adjusting mechanisms are hardened and ground.

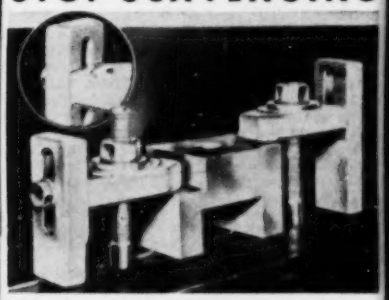
a. 3"x3" (w/T-slots) $35
b. 6"x6" (w/tapped holes) $75
c. 3½"x4" (Sine plate) $125
e. 9"x12" (worm drive, compound angle) $250

• FOR 10 DAY FREE TRIAL MAIL AD TO:

MONTGOMERY & CO., Inc.

49 Park Place, N.Y.C. 7

STOP SCAVENGING



• Quickly switch from large to small workpieces without time wasting, tedious hunting of scrap shims. How? Easy with these drop forged, serrated clamps. Holds work up to 6" high.

• Set contains crosspieces (2 plain, 2 goosenecks) and uprights (2 each of 2", 3", 4" and 6"). Crosspieces take up to ⅞ T Bolts. **Price $17.50.** For 10-Day FREE TRIAL mail ad to:

MONTGOMERY & CO., Inc.

49 Park Place, N.Y.C. 7

Boring Heads

Flynn Mfg. Co., 5437 Bates St., Detroit 26, Mich., has announced two new boring heads, designated as the Models 24 and 25, for small jig borers, turret lathes, and light milling machines. The Model 24 is designed to hold cutting tools in a vertical position, while the Model 25 can be used to hold cutting tools in both vertical and horizontal positions. A dovetail slide and extended jaw or toolholder are incorporated in each model.

Compact and light in weight, the heads each measure 2⅛-inches in diameter; have a bar capacity of ½-inch; can be offset to a maximum of ½-inch. Other features of each model includes a safety round contour; ground micrometer screw with easy to read dial, graduated in thousandths of an inch; hardened V-tool lock; single wrench for all adjustments; and threaded back for interchange of arbors and adapters.



Flynn Models 24 (above) and 25 Boring Heads

CAMS

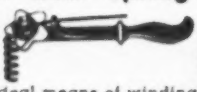
Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

We Solicit Your Inquiries.

BLOOMFIELD TOOL CORP.

37 FARRAND ST. BLOOMFIELD, N. J.

A Real Spring Winder!



Will earn its cost in one day. The Hjorth Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

No. 1 Capacity 0 thru 3/32" wire $1.50
No. 2 Capacity 0 thru 3/16" wire $3.00
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HJORTH LATHE & TOOL CO.

10 BEACON STREET WOBURN, MASS.

Improved Air Regulator-Filter-Lubricator Unit

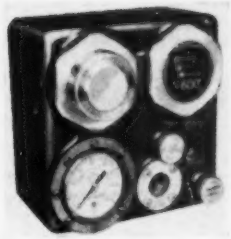
The Logansport Machine Co., 801 Center Ave., Logansport, Ind., has announced several improvements in its air regulator-filter-lubricator which is designed to regulate air pressure and filter and lubricate the air. The unit now incorporates a piston-type regulator, a synthetic-type filtering element, a pressure gage, and a lubricator. The filter cover and regulating valve screw di-

GILMORE DIAMOND TOOLS



NEEDLEPOINT DIAMONDS (PHONOPOINTS)
SHARP, DURABLE, BEST QUALITY; DISCOUNTS IN QUANTITIES
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F. F. GILMORE & CO., INC. • 285 COLUMBUS AVE., BOSTON 16, MASS.



Logan "R-F-L" Air Regulator-Filter - Lubricator Unit

rectly into the main body of the unit. Two knobs on the front panel provide a means for the accurate regulation of air pressure and the amount of oil injected as required by the individual job. A third knob is furnished for draining the water trap. Indicators provide ready visibility of both air pressure and oil level.

The Logan "R-F-L" Unit measures 6 inches square x 4¾ inches deep and is designed for installation in the air intake line from the main air line and can be mounted on a central control panel.

Rotatable Blade Keyhole Saw

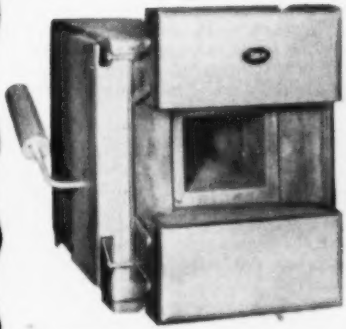
The Millers Falls Co., Greenfield, Mass., has introduced a rotatable blade keyhole saw, designated as the No 525, which is designed to cut steel, iron, nails, bolts, metal lath, non-ferrous metals, and many other materials. The saw utilizes an 11¼-inch blade which is said to reach into tight places and can be turned and locked in any one of eight positions, thus keeping the handle in the clear at all times. Standard equipment includes an easily interchangeable 10-tooth-to-the-inch "Tuf-Flex" blade of special hack saw alloy steel, heat treated to produce a hard, tough, flexible blade. Special purpose blades are also available.



Millers Falls No. 525 Keyhole Saw

The saw is finished in glossy gray and red enamel, and the blade holder and knurled thumbscrew nut are nickel plated. Overall length of the saw is 15½ inches.

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Eight convenient sizes of electric bench-type units to solve your heat-treat problems. Available with either electronic or manual temperature controls.

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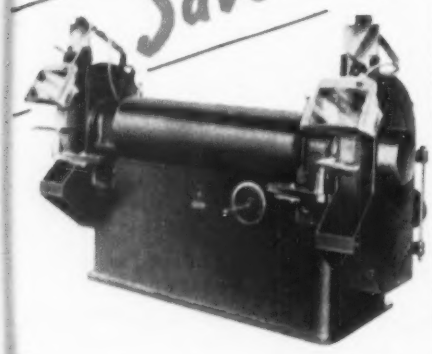
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488 W. Locust Street Dubuque, Iowa

Announcing the NEW LINE of Bradford Variable Speed Snagging Grinders

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Save ON LABOR



Bradford heavy duty snagging grinders—*with infinitely variable speed range*—maintain constant surface speed. Speed can be adjusted while grinder is running. No belts to change or gears to shift. Designed to maintain 9500 SFPM with resinoid bonded high-speed wheels. Built to American Standard Safety Code specifications.

Four distinct models for wheels size 20" to 30" diameter by 2" to 4" face—7½ HP to 30 HP.

You'll get more and better production plus substantial savings in wheel costs and labor with Bradford Variable Speed Snagging Grinders. Complete details and specifications will be sent on request.

THE BRADFORD MACHINE TOOL COMPANY

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Precision Since 1840

New Shop Literature

Sound Films. A six-page two-color folder describing three 16 mm. films for group showing entitled "Man-Au-Trol—Master of the Machine," "Three for One," and "Bullard Pioneers Interchangeability Without Jigs" has been released by The Bullard Co., Bridgeport 2, Conn. Ordering and shipping instructions concerning the films are included.

Air Turbine Portable Grinders. A four-page two-color bulletin (No. 1129) issued by Onsrud Machine Works, Inc., 3924 Palmer St., Chicago 47, Ill., covers the company's complete line of air turbine portable grinders. Typical applications of the grinders are illustrated, and specifications and other data are included.

Air and Hydraulic Power. Designed to provide a better understanding of the possibilities of air and hydraulic power, an eight-page two-color booklet released by Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass., presents information and circuit diagrams showing how these types of power may be applied to industrial equipment.

Solenoid Air-Operated Valve. A six-page three-color bulletin (No. AU-250) describing and illustrating in detail the "Electroaire" Solenoid Air-Powered Valve for fast, safe, and economical operation has been released by The Bellows Co., 222 W. Market St., Akron, Ohio. Wiring diagrams and dimensional drawings are included.

Replaceable Type Air Filter for forced air heating, ventilating, and air conditioning systems is fully described and illustrated in a six-page two-color folder issued by the American Air Filter Co., Inc., 100 Central Ave., Louisville 8, Ky. Dimensional diagrams and specifiations are included.

Precision Ground Flat Stock and Die Stock in oil, and water, and water hardening types are fully discussed in a four-page two-color illustrated bulletin (No. 1103) released by The L. S. Starrett Co., Athol, Mass. Useful information on structure and analysis, heat treatment and tempering, as well as price information, is also presented.

"Proving Ground for Production" is the title of an eight-page two-color bulletin released by Behr-Manning, Dept. MS, Troy, N. Y., describing and illustrating the company's methods and equipment demonstration rooms used for protecting abrasives under laboratory, simulated production conditions. Case histories are described, and six-page folder on oilstone files is included.

Keyless Ball Bearing Drill Chuck. A four-page two-color bulletin (No. 7) released by the Ettco Tool Co., Inc., 598 Johnson Ave., Brooklyn 6, N. Y., provides information and specifications on its keyless ball bearing drill chuck designed for use on any type drill press, electric drill, lathe, milling machine, or for any machining application where positive gripping power is required.

Thread Generating Machine. A 12-page two-color illustrated bulletin released by the George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y., presents the Cornelius generator for cutting threads, lead screws, valve screws, and so on. Specifications are included.

Extractors. Two eight-page folders, one illustrating and describing tap extractors for removing broken taps and the other covering pipe and stud extractors for removing broken pipe, studs, and screws, have been issued by The Walton Co., Hartford 10, Conn. Specification and price information is included.

Lubricating System. A four-page illustrated bulletin (No. J.S. 10885) released by the Graymills Corp., 1948-52 Ridge Ave., Evanston, Ill., describes the "Stocklube" System designed to provide automatic pressure lubrication for the stamping and forming of roll, strip, and sheet stock. Specifications and dimensional diagrams are included.

Air-Cylinders and Air-Operated Vises. Catalog No. 100, Section 1, a 14-page illustrated catalog issued by the Logansport Machine Co., 801 Center St., Logansport, Ind., presents data on its stationary and rotating air cyclinders for pushing, clamping, holding, lifting, and so on. Air-operated vises are also discussed. Complete specifications are provided for each type cylinder and vise.



General Purpose Lathe. Hardinge Brothers Inc., Elmira, N. Y., has released a six-page bulletin (No. HL) describing and illustrating a 10-inch general purpose lathe with a solid full bearing carriage. Specifications are included.

Selenium Rectifiers. A four-page two-color illustrated folder released by the Syntron Co., 309 Lexington Ave., Homer City, Pa., covers the features and construction of selenium metallic rectifiers used to supply d.c. power to arc welders, magnetic chucks, magnetic separators, relays, solenoids, and other equipment.

"ALL-WAY" LEVEL



The Fell Precision Level shows the level of all directions at once to an accuracy of .0005 inch per foot. It saves time in the manufacture and maintenance of machinery. Made in sizes 3½" x 6" and 5½" x 12", also 4" and 5" dia. for permanent mounting.

Write for Information

WM. B. FELL CO.

320 McLAIN AVE. ROCKFORD, ILL.

Magnetic Chucks. A 16-page bulletin (No. 500-M) now available from Sundstrand Magnetic Products, 1830 18th Ave., Rockford, Ill., includes helpful information on how to simplify toolroom work, general purpose milling, and production machining operations with Sundstrand Magnetic "Power-Grip" Chucks.

Steel Cabinet Benches. Standard Pressed Steel Co., Jenkintown 22, Pa., has released an eight-page two-color bulletin (No. 702) which describes and illustrates a line of steel cabinet featuring all-steel construction, choice of top materials, ample storage space, standardized units, interchangeable accessories, and attractive appearance.

Power Wrench Bulletin No. 215 published by The Cushman Chuck Co., Hartford 2, Conn., provides descriptive and technical data on a new power wrench and control equipment available for application to single spindle machine tools. Information on operation, construction features, installation, and wiring is included.

Die-Cut Stamped Name Plates. A four-page three-color folder released by the Dayton Rogers Mfg. Co., Minneapolis 7, Minn., mentions the facilities of the company to produce die-cut stamped name plates. Price information on, as well as illustrations of actual size samples of name plates, is included.

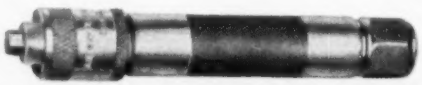
Mounted Wheels and Points, available in a wide range of sizes and shapes and in different bonds for particular jobs, are presented in a four-page two-color illustrated catalog released by the Bay State Abrasive Products Co., Westboro, Massachusetts.

Air-O-Check

THE VALVE WITH THE INTERNAL FULCRUM LEVER

AIR GUNS—THAT LAST AND LAST . . .

For blowing chips from work — For cleaning out hollow sets, machine recesses and tee slots — For drying parts before inspection and for many similar uses, Air-O-chek is *the* Airgun.



The internal fulcrumed lever is a basic design in all Air-O-chek Airguns, Spraygunsand Casing Valves. Write for details.

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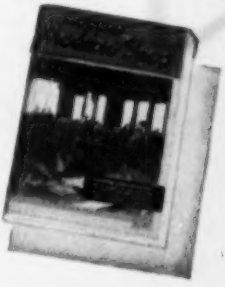


"SWIVEL CHAIR RESEARCHER"

This fellow is what's known as a "swivel chair researcher." Sits in his big office day after day and mutters about rifles versus shotguns for hitting the advertising bullseye. Says the only prospect for his product is a manufacturer of blue wrenches with left-hand threads. According to him, MODERN MACHINE SHOP reaches too many people.

WHAT HE DOESN'T UNDERSTAND IS

that MODERN MACHINE SHOP, which blankets the metal working industry, has thousands of readers who are adapting tools and methods to new uses. They are the alert manufacturers ready to tell you something that you haven't thought of about your own product. Prospects are not born—they're created by telling your story to a mass audience. MODERN MACHINE SHOP has the interested audience. Results tell the story. Gardner Publications, Inc., Cincinnati 2, Ohio.



Hydraulic Attachment consisting of motor, pump, cylinder, and foot control system for use on its No. 2 universal pipe, bar, and angle iron bending machine is described in a two-color illustrated bulletin published by the Hossfeld Mfg. Co., Dept. M, Winona, Wisconsin.

Welding Unit. A two-color illustrated catalog sheet issued by The Lincoln Electric Co., Dept. 253 Cleveland 1, Ohio fully presents the "Fleetwelder," a 200-ampere unit for heavy or light a.c. welding operations.

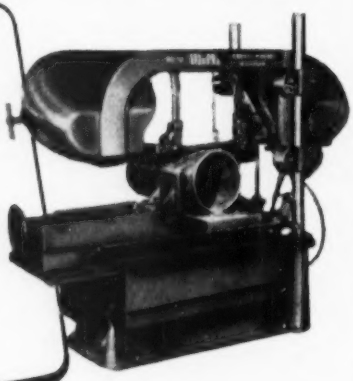
"Making and Inspecting Bronze Aircraft Engine Parts" is the title of an article now available in the form of an eight-page two-color reprint from the American Non-Gran Bronze Co., Berwyn, Pa. The reprint provides details, including diagrams, of the care taken and methods used in casting and machining aircraft engine parts to ensure dimensional accuracy.

Circular Sawing Handbook No. 240 prepared to serve as a convenient 24-page guide in the circular sawing of various types of materials and containing information in the form of tables covering the proper selection of saw blades, the operating speeds and feeds, and tooth angles for sawing ferrous and nonferrous materials has been released by the Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland 13, Ohio. The handbook is divided into two general sections, the first dealing with the circular sawing of materials and the second describing slitting and slotting operations.

Tungsten Carbide Tools. A 44-page three-color catalog listing and illustrating its complete line of tungsten carbide tools has been released by the Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1, Mich. The catalog covers boring bars and bits, broaches, centers, milling cutters, dies, gage bushings, mills, reamers, saws, tips, and turning tools.

BIG JOBS or little jobs

Handle them speedily, economically on a WELLS No. 12 METAL CUTTING BAND SAW!



The Wells No. 12 Saw is a sturdy production tool for fast and accurate cutting at a minimum cost. It doesn't require an expert to operate this machine. Just place the stock in the quick-acting vise and push the starting buttons — the hydraulic head descends automatically, feeding the blade into the stock at a uniform rate, governed by electrically controlled, adjustable blade pressure. At the completion of the cut the head returns to a predetermined raised position and the motors shut off.

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Extra Long Length

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No. 1 - 60

No. By Gage	Length Inches	Our Price Net Each
1 to 10	6 1/4	$ .90
11 to 20	5 3/4	.80
21 to 30	5 3/8	.70
31 to 40	5 1/4	.60
41 to 50	4 1/2	.50
51 to 60	4 1/4	.40

Straight Shank

Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
1/8	12	9	$1.50
9/64	12	9	1.50
5/32	12	9	1.50
11/64	12	9	1.50
3/16	12	9	1.50
13/64	12	9	1.60
7/32	12	9	1.60
15/64	12	9	1.75
1/4	12	9	1.75
17/64	12	9	1.85
9/32	12	9	1.85
19/64	12	9	2.00
5/16	12	9	2.00
21/64	12	9	2.25
11/32	12	9	2.25
23/64	12	9	2.50
3/8	12	9	2.50
25/64	12	9	$2.75
13/32	12	9	2.75
27/64	12	9	3.00
7/16	12	9	3.00
29/64	12	9	3.25
15/32	12	9	3.25
31/64	12	9	3.25
1/2	12	9	3.25

Taper Shank

Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
17/32	15	12	6.50
9/16	15	12	7.00
19/32	15	12	7.50
5/8	15	12	8.00
21/32	15	12	8.00
11/16	15	12	8.25
23/32	15	12	8.50
3/4	15	12	8.50
25/32	15	12	9.50
13/16	15	12	11.00
27/32	15	12	11.50
7/8	15	12	12.00
29/32	15	12	12.50
15/16	15	12	13.00
31/32	15	12	14.00
1	20	15	16.00
1-1/16	20	15	17.00
1-1/8	20	15	18.00
1-3/16	20	15	20.00
1-1/4	20	15	22.00

VICTOR MACHINERY EXCHANGE, Inc.

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Grinding Machines. A four-page four-color folder released by the Reid Brothers Co., Inc., Beverly, Mass., describes and illustrates its line of surface grinders, plus wet grinder and dust control attachments. Specifications for each type grinder are included.

Tachometers. A series of three two-color bulletins published by The Electro-Mechano Co., 265 E. Erie St., Milwaukee, Wis., describes and illustrates portable electric tachometers, tachometer indicators, and tachometer generators repectively.

Side Housing Presses. A series of bulletins covering its complete line of side housing type hydraulic metal-working presses have been released by the Lake Erie Engineering Corp., Woodward Ave., Buffalo, N. Y. Bulletin 2.1 covers design features, such as press structure, hydraulic system, cushions, electrical circuits and controls, and operation; Bulletin 3.1 presents single-action models and illustrates the many types and sizes available as well as their applications; and Bulletin 4.1 deals with both double and triple-action models, illustrating the various types and sizes and their applications.

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Threaded Plastic Balls
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Cast Iron Hand Knobs, Three Styles

Machine Handles
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Hand Wheels
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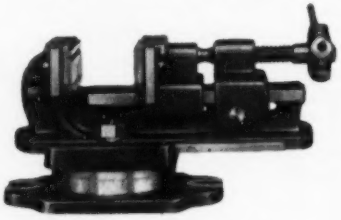
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GEM VISES

Built to do the usual jobs better, and the unusual jobs well.



Extra capacity, extra depth jaws.
Sturdy, long-lasting construction.

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THE CRALEY OFFSET BORING HEADS

Offset boring heads, made in nine sizes, have minimized overhang and easily read calibrations. The boring bars go to the bottom of the dove-tail bearing to make short set-up. Tension screws are on opposite sides and ends of block, so that all cutting strain is thrown against solid metal.

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Model MG

HAVE YOU SEEN

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-:- COMPARE -:-



Capacity: 8¾" transverse, 13" longitudinal, 12" vertical under 7" dia. Wheel with Adapter. Meehanite Castings and the very sturdy construction (weight appr. 630 lbs.) assure long life, accuracy, vibrationless operation, form grinding by crush methods and finishes to microinches, dry or wet.

WRITE FOR COMPLETE DETAILS

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1021 COMMERCE AVENUE
UNION, NEW JERSEY

Dies. Precision cast Allite dies for producing experimental or short run parts are described in a four-page bulletin released by Allied Products Corp., Richard Brothers Div., Dept. 47, 12665 Burt Rd., Detroit 23, Mich. The bulletin also describes and illustrates the coordinated foundry and die shop facilities of the company for producing the dies.

"Furnace Treatment of Republic Union Cold Drawn Steels" is the title of a 16-page two-color booklet (Adv. 452) issued by the Advertising Div., Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio, which describes briefly each of the various types of modern furnaces used in heat treating carbon and stainless bar steels.

Tool Steel Selector. A nine-inch circular selector chart devised to take "trial and error" out of tool steel selection for the smaller jobbing and specialty machine shops, as well as large users of tools steels, has been made available by the Crucible Steel Company of America, 405 Lexington Ave., New York 17, N. Y. The chart is based on 22 readily obtainable tool steels which will meet the requirements of most all tool steel applications. A working chart for the selector is provided.

Steam Traps. Catalog No. 250, a 32-page two-color release issued by W. H. Nicholson & Co., 136 Oregon St., Wilkes-Barre, Pa., illustrates and describes five types of thermostatic steam traps for pressures to 225 lb; two types of expansion steam traps for pressures to 250 lb; three types of weight-operated traps for steam air, and gasoline for pressures to 1500 lb.; piston-operated steam traps for pressures to 650 lb.; and three types of steam, air, and gas separators. Capacity tables and installation diagrams, as well as a section containing data, charts, and formulas for determining the proper size trap for specific applications, are included.



DUSTS ARE DANGEROUS!

The Dust King

DUST COLLECTOR
is a proven means of collecting it.

Easily attached to:

Buffing and Polishing Lathes
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All machines where dust arises

Is 47" high and 28" x 33" square.
Delivers 1540 CFM while maintaining 4½" S. P. on two 4½ pipes.
Can handle two large wheels simultaneously.



Front view of Model A-6 Dust King.



View showing unit with top lid and front door removed.

Contains 2 HP-3 ph. 220-440 v. motor (also delivered with single and 2 ph. motors).

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INSTALLATION OF THE Dust King IS A GUARANTEED METHOD OF DUST CONTROL
Easily maintained.

Manufacturers of Dustex portable dust collectors for 8 years

DUST FILTER COMPANY

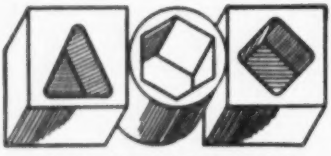
134 SOUTH LASALLE STREET **CHICAGO 3, ILLINOIS**

Deep Hole Drilling Tool. A four-page two-color illustrated bulletin describing a deep hole drilling tool designed for use with automatic screw machines in performing drilling operations in which the holes to be drilled are four or more times deeper than the diameter of the drill has been published by the Boyar-Schultz Corp. 2120 Walnut St., Chicago 12, Ill. Specifications and dimensional diagrams of the tool are included.

Self-Tapping Screws. A 48-page two-color bulletin (Form 430) released by the Parker-Kalon Corp., 200 Varick St., New York 14, N. Y., contains illustrations and complete descriptions of the various types of P-K self-tapping screws. Detailed information on hole sizes, stock sizes, head styles, dimensions, and so on, is included.

Cylindrical Grinders. A 28-page two-color general catalog issued by the Landis Tool Co., Waynesboro, Pa., outlines its line of standard and special purpose cylindrical grinders which includes universal, plain, roll, crankshaft, cam, valve, multiple wheel and race grinders. Diagrams, operation sketches, illustrations, and specifications are included for each type grinder.

Industrial Tools. A 20-page two-color catalog issued by The Dumore Co., Racine, Wis., provides complete application and buying information on its line of tool post grinders, hand grinders, flexible shaft tools, high speed quills, and high speed drilling equipment. Illustrations feature on-the-job applications of various tool setups, and charts and instruction tables are also included.



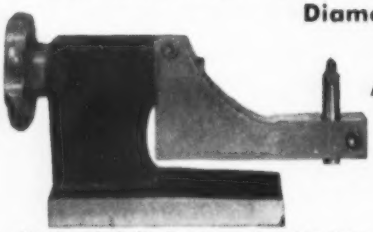
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TOTE PANS
20" Long x 12"
Wide x 6¼" Deep
16 Ga., drag holes,
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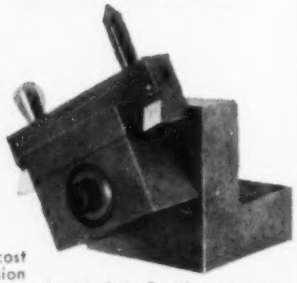


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The "MIGHTY MIDGET" Line
ORDER DIRECT on our 10 day money back guarantee.
RADIUS DRESSER $34.00 **ANGLE DRESSER $39.00**
Diamond $7.00



Special Size Angle and Radius Dressers Made to Order. Send for Quotation.



Hardened shaft—Bearing adjustable for wear. Diamond always perfectly centered. Easily set adjustable 180° stops.
10" Wheel size for DoALL and NORTON Grinders—$39.00. Diamond $7.00.
SPECIAL 14" Wheel Size $89.00.

First low cost high precision Angle Dresser on the Market. Can be set very accurately with a Protractor. Works underneath the wheel. Large bearing surfaces.

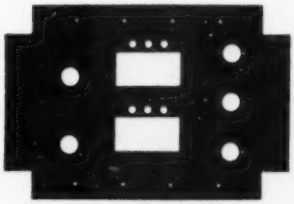
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COMPARE! the Wiedemann R-41P with your best times on jobs similar to those below on sheets up to 26" x 48".

TIMES! shown include set-up.

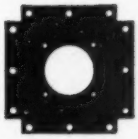
INVESTIGATE the WIEDEMANN METHOD



First piece 9.5 minutes
Additional pieces
2.75 minutes each
Includes all set up



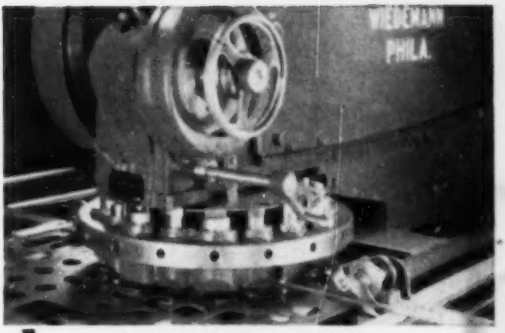
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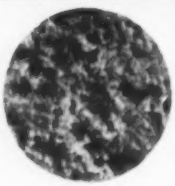
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Screw Driving Machines, Fixtures, Motorized Hopper Units, Nut Driving Machines, and Special Assembling Machines are fully discussed in a 44-page profusely illustrated booklet released by the Detroit Power Screwdriver Co., 2807 W. Fort St., Detroit 16, Mich. Dimensional diagrams and specifications are included for each type of machine.

Steel Stamps. Details on dimensions, character sizes, and prices for the various sizes and styles of Mecco "Safety" Steel Stamps for all types of industrial marking applications are presented in a four-page two-color bulletin published by the M. E. Cunningham Co., 158 E. Carson St., Pittsburgh 19, Pa. Steel hand stamps for applying straight line, curved line, concave or convex markings on tool steel brands, end cuts, trade marks, and so on, are also described.

Milling Machine Arbors and Adapters are described and illustrated in a 12-page two-color bulletin (No. 2-50) published by Scully-Jones & Co., 1907 S. Rockwell St., Chicago 8, Ill. "A" and "B" Style arbors, arbor bearing sleeves, solid and adjustable spacing collars, shell end mill arbors, and other adapters, and milling machine sleeves, are also described. Specifications and prices for each type arbor and adapter are included.

Solenoid Valves. Two four-page two-color bulletins (Nos. 501 and 505) issued by the Skinner Electric Valve Division, The Skinner Chuck Co., Norwalk, Conn., describe and illustrate its solenoid valves. Bulletin 501 provides complete data, specifications, and dimensional diagrams on the V-5 Series of valves. Bulletin 505 affords complete details on the V-5, M-2, and M-3 Series of solenoid valves.

Indicating Micrometer. A four-page three-color bulletin released by the Federal Products Corp., 1146 Eddy St., Providence 1, R. I., presents the Model 200 P-1 indicating micrometer which features a dial indicator for easy reading. Illustrations and specifications, as well as information on dial indicator snap gages, are included.

Air Cylinders. A 16-page two-color illustrated bulletin (No. 731) issued by the Air & Hydraulic Div., Lindberg Engineering Co., 2469 W. Hubbard St., Chicago 12, Ill., describes its complete line of air cylinders which feature one-piece pistons and synthetic V-packings that simplify snapping into the piston groove. Specifications and dimensional diagrams are included for each type of cylinder.

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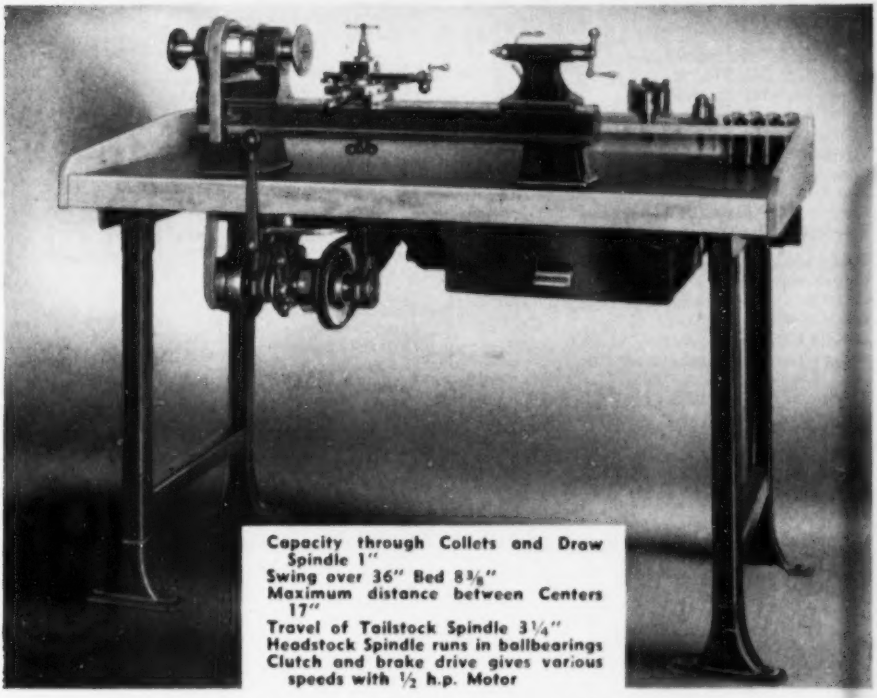
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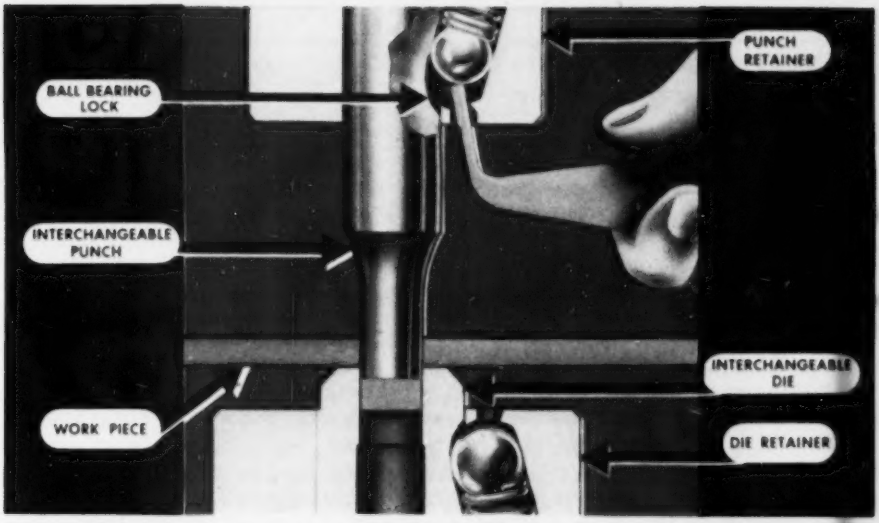
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Over The Editor's Desk

The Charge: Criminal Neglect of Duty.

REPRESENTATIVE Lawrence Smith, of Wisconsin, recently presented figures to the lower House of Congress showing that western European countries sold, during 1949, more than a billion dollars worth of goods to Russia, including iron, steel, machine tools, and machinery. These sales were made to the Soviet by nations which had received much of the material in question from the United States under the Marshall Plan, and there is no question but that these materials could and would be used against our country if it should ever get into a war with Russia.

Congress has set up nearly 3 billion dollars to be used by the ECA this year as "aid" to the European countries, in an effort to keep them from sinking into the chaos which would make them easy prey for Communism. We are pouring our billions into these countries at a time when they are desperately in need of help, hoping that they will stand with us against the tide of communism—the philosophy of slavery and despair. But now we find that, instead of aligning themselves with us against the great threat to world peace, they have been shipping war materials—for machine tools are war materials—to our common enemy.

On August 26, Winston Churchill charged that Britain's Labor government has for the past two years permitted British factories to make tools for the Soviet Union's war machine. He further declared that Russian inspectors were allowed inside British work shops where secret production is under way for the British army. He also said the tools for manufacture and repair of tanks have been sent to communist Poland as well as to Russia.

Exports of British machine tools to Russia in the first seven months of this year came to $1,700,000. It is reported that one British manufacturer is so tied up with the Russian orders that his firm won't be able to take on any British rearmament orders for many months. Estimates are that 10 to 15 per cent of the present British out-put of heavy machine tools is contracted for by the Russians for the next two years. Meanwhile, the British rearmament effort demands machine tools.

British Prime Minister Clement Attlee made a statement in which he confirmed the report that tools to build and repair tanks were being shipped to Russia, but added "no items of strategic importance are getting out." He further declared, however, that an embargo on the products that Russia wants to buy would probably be followed by Russian refusal to sell grain, timber, and other vital products to the British.

Commenting upon Mr. Attlee's remarks, Tell Berna, General Manager of the National Machine Tool Builders' Association, says "Attlee's reply to Winston Churchill regarding England's machine tool shipments to Russia reveals either an incredible ignorance of the nature of uses of machine tools or the setting up of a limited forbidden shipment list as a political cover-up for the extensive range of machine tools that England is continuing to sell to Russia and the Red satellite nations.

"But even if Mr. Attlee does not possess this rudimentary knowledge and really believes that only these machine tools on the forbidden list are of critical importance

to war work, why are shipments of these very machines still continuing on contracts concluded prior to 18 months ago?

"France, Italy, and Western Germany are also shipping machine tools to Russia or satellite countries. All of these countries, including England, are getting ECA aid. In Italy, ECA helped to finance machine tool production on behalf of postwar rehabilitation. But today there are more manufacturers of lathes and vertical drilling machines in Italy than there are in the United States. Italy does not require that much machine tool capacity. Is the Russian market the answer?

"In West Germany, where the revival of the machine tool industry is part and parcel of the recovery program financed by American taxpayers' money, machine tools are being built for shipment to the satellite nations in the Russian orbit, under permit from the American military authorities. For example, in Offenbach horizontal boring mills are being built for shipment to Poland, and in Frankfort way grinders are being built for shipment to Hungary. Machines of these types are of vital use in the production of war materiel.

"The United States cut off shipments of American-built machine tools to Russia or satellite countries some two and a half years ago. In fact, our State Department recently held up the export of certain American-built machine tools to Italy, France and Sweden, on the ground that the products made on those machines might get to Russia. But while with one hand we deny machine tools to Russia, with the other we give England, France, Italy and West Germany money to help build up machine tool industries which are shipping to Russia and satellite nations.

"This picture simply does not make sense—but those are the facts, and that is the way the picture has stood for the last two and a half years. We have discussed it time and time again with the Department of State, the Department of Commerce, the National Security Resources Board, and various heads of the Armed Forces, without result.

"Mr. Churchill has called international attention to a situation which cries for immediate corrective action. If we have in fact an Atlantic Pact for mutual defense, why should not our allies in this pact observe the same precautions which our State Department has long since ruled imperative with respect to the United States?"

Nothing that your editor could say would add emphasis to Mr. Berna's remarks. The fact is that Russia is working 24 hours a day preparing for war. Under Russian domination, all of the resources of the satellite nations are being applied to this end. In a conversation recently with a British manufacturer who has been behind the Iron Curtain within the past few months we learned that the great Skoda Works in Czeckoslovakia is producing guns for the Russian army, and that it is well-known in Czechoslovakia that Russia has one hundred thousand large tanks, one hundred thousand medium tanks and 50 thousand small tanks built and under wraps against the day when they will be needed.

The first responsibility of government is the protection of its citizens. What is the matter with our own government when it fails so grossly to give the American people this protection?

Howard Campbell

There's One in Every Shop — *By Wesser*



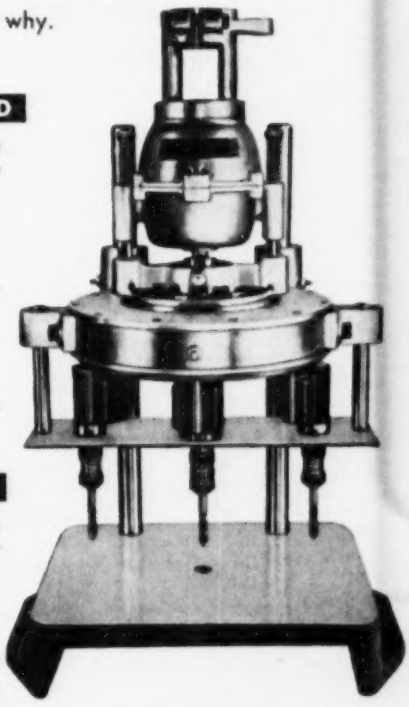
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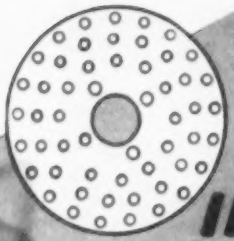
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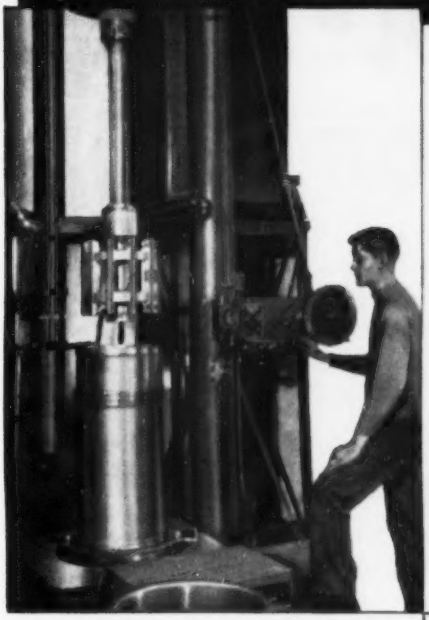
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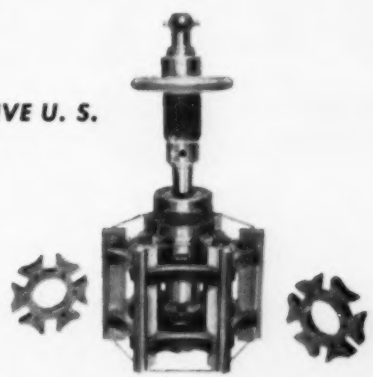
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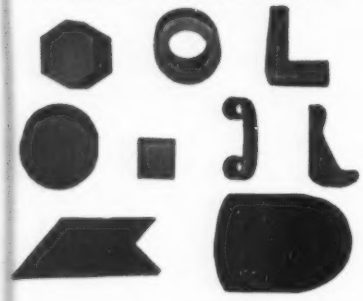
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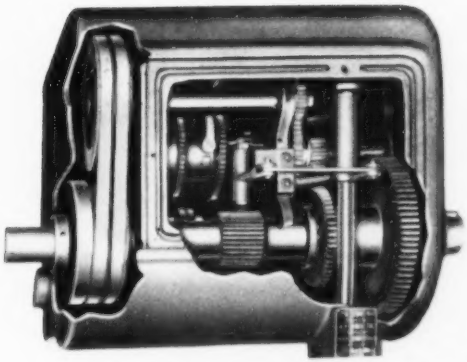
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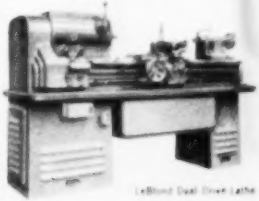
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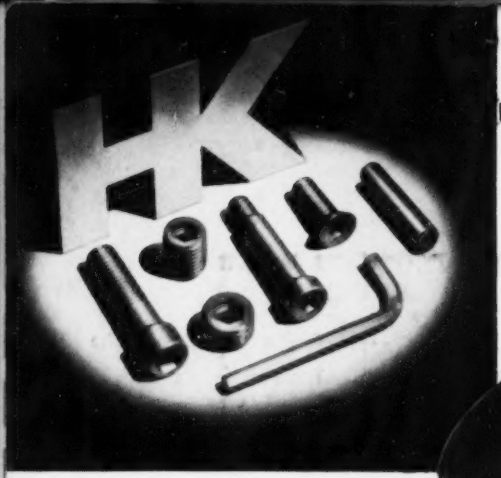
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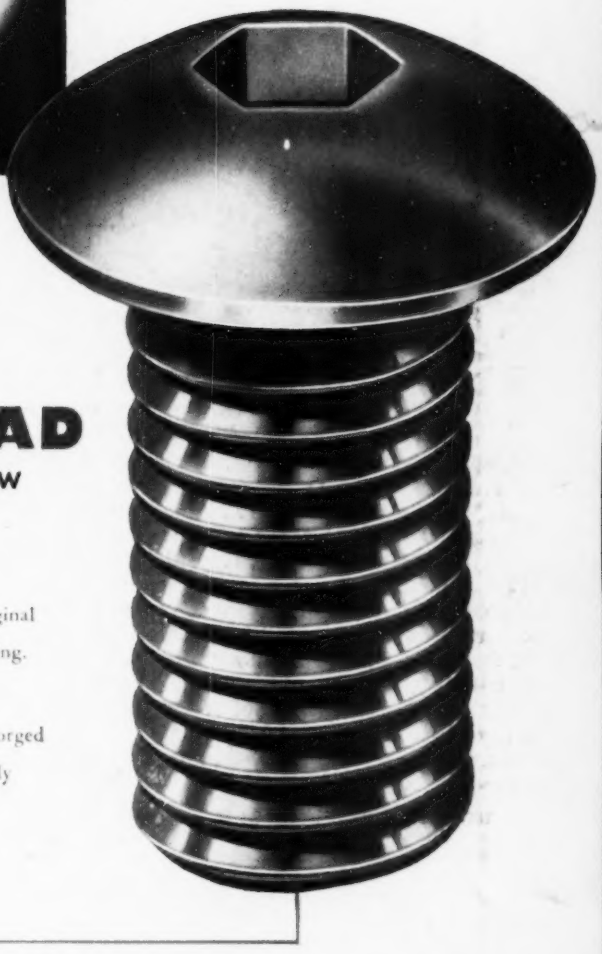
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